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New Year Opening With Promise

Contracting Movement in Steel for First Quarter Becomes More Active—Automotive Interests Place Further Large Tonnages—Structural Awards and Inquiries Numerous —Outlook for Increased Operations After Jan. 1 Considered Promising

THE year of 1923 is ending in the iron and steel business not unlike that of 1922. Buying is on the upgrade and prospects are favorable. The outlook for the new year has been improving steadily from week to week, dating back to mid-November and sentiment has become increasingly confident. The result is an expanding market, based on the covering for future requirements and this is expected to broaden still further with the completion of inventory-taking and the usual details incident to the balancing up of the year's business. Consumption apparently is running high and according to present indications is more likely to increase than to shrink during the coming months.

If the parallel of a year ago is borne out, operations in the first half should show progressive enlargement. During the past seven months, they have gradually settled until they have reached a point about 22 per cent below the high level of last April and May. At present production is at 70 to 71 per cent for the whole country. A year ago they were about 80 per cent. The Steel corporation plants are slightly higher, showing 84½ per cent of ingot capacity engaged the past week while the independents have not done quite so well, averaging 63½ per cent compared with 65 per cent one week ago.

IRON TRADE REVIEW composite of fourteen leading iron and steel products ends the year at $43.02, a slight advance over last week. One year ago it was $40.65.

Close Many Contracts

Contracts for first quarter requirements of steel by consumers has been active and has embraced a widened circle of buyers in diversified lines. Further heavy tonnages for 1924 delivery have been placed by some of the larger consumers, notably in the automotive group. The General Motors Corp. has distributed its first quarter needs with a number of the mills. The normal requirements of this buyer for a single quarter are not less than 100,000 tons. The Willys-Overland Co. also has closed for first quarter with an estimated total of 25,000 to 30,000 tons. One automotive contract placed this week with a Chicago mill calls for 12,000 tons. Nut and bolt manufacturers in the Cleveland district have been heavy buyers. Jobbers as well as manufacturing consumers have been entering the market and some contracts closed of this character have called for 10,000 tons individually.

New Inquiry Active

Railroad orders the past week have not been numerous though inquiries from this source are heavy. The New York Central has been a heavy buyer of track fastenings for 1924, the total it is reported, exceeding its recent large inquiries. It placed 20,000 tons of tie plates with several producers and 75,000 or more kegs of spikes. About 130,000 tons of rails for foreign countries is being inquired for here.

The rising line of building continues to be reflected by structural steel activity. This week has brought forth a total of 47,400 tons of new awards including 18,000 tons for the New York Telephone building, New York, and 14,000 tons for the Pictorial Review building, New York. Another section of the Newark bridge, 8000 tons is out, and it is estimated the total for this job eventually will reach 50,000 tons

The week in pig iron has been quiet, the effect both of the holiday period and of the heavy buying of a few weeks back. Steelmaking grades continue to develop some broadening of interest among consumers. A Canton, O., plant bought 5000 tons of basic from a nearby furnace. Two St. Louis interests want 5000 tons each.

Ruhr Plants Resuming

Operations in the Ruhr are reviving under the agreement reached between the forces of occupation and the Stinnes, Thyssen and Kloeckner groups. A dozen furnaces have resumed according to cable advices to IRON TRADE REVIEW and German offerings of steel are increasing. While the details of the agreement have not been made public officially, it is understood the main points are that the German producers have agreed to pay $15,000,000 representing taxes due for June 1 to Nov. 1, will deliver 18 per cent of production to the allies without cost and will pay 10 francs ($0.55) for each ton of material sold. Stocks of iron and steel and related products on hand Oct. 1 will remain the property of the allied authorities.

Business Trend and Chart Section Page 1717

Pig Iron Situation Satisfactory

Holiday Quiet Finds Furnace Interests With Large Order Books and Confident of Early Renewal of Buying—Some Good Prospects in Market—Small Sales Persist—Price Position Unchanged—Fewer Weak Spots

PITTSBURGH, Dec. 24.—Indifference on the part of pig iron producers because of their heavy backlogs of business and their present desire to obtain higher figures meets a like measure of indifference on the part of the greater number of pig iron consumers. Many of these latter, particularly the larger users, have covered for their first quarter needs; those who have not protected themselves are buying single carloads to tide them over the holiday period when operating schedules at best are spasmodic. Steelmaking iron is particularly lacking in activity, no inquiries at all being before the trade for either basic or bessemer. No sales are noted in the former and only single carloads are being moved in bessemer. The recent negotiation for 5000 tons of basic developing a $20 valley price has not been concluded. Most producers quote $21 valley, on basic, and $23 valley, on bessemer. Spots of weakness appear from time to time however, in both grades and a $22.50 valley basis still is available on tonnages of bessemer. The Pressed Steel Car Co. was in the market a short time ago for a quantity of malleable iron but is understood to have decided not to buy. The Ohio Malleable Iron Co., Columbus, O., is reported to have closed in southern Ohio for its 3000 tons of malleable. Here, malleable continues to be quoted at all the way from $20 to $22.50, valley, those maintaining the latter quotation being out of the running for the time being. Inconsequential tonnages are being placed with one or two sellers of foundry iron who are willing to quote $22 valley; others quoting $22.50 and $23 report no sales or inquiries. Another valley merchant producer now is talking of advancing its minimum to $22.50 valley on the No. 2 grade (1.75 to 2.25 silicon). Gray forge is quoted 50 cents under No. 2 foundry but all buyers in this immediate vicinity have apparently covered. Low phosphorus copper-free iron is unchanged at $29 valley, as is low phosphorus copper-bearing at $28 Lebanon. Little or no interest is encountered. A canvass among consumers of pig iron in the Pittsburgh and Buffalo districts reveals the encouraging belief that while consumption at present is light, it is scheduled to increase during the first quarter so that purchases of iron which were supposed to be sufficiently large to extend over to meet at least a portion of their needs in the second quarter will by then have been exhausted, except in the case of large radiator interests, and will have to be replenished. By February, large buying is expected to be done for second quarter consumption which undoubtedly will be large unless interfered with by a coal strike.

Holiday Lowers Sales

Boston, Dec. 24.—While pig iron sales during the past week have been unusually low, inquiry for small tonnages is improving and a cheerful sentiment exists in the trade. Foundry activity has slowed down somewhat for the holidays but programs for January are heavier than the December rate. The low spots in the pig iron market have disappeared with the exception of a little resale iron. Buffalo furnaces are firm at $22.00 which means $26.92 delivered. Eastern Pennsylvania furnaces are quoting from $23.00 to $24.00 for No. 2X iron, silicon 2.25 to 2.75. The freight rate to most New England points it $3.65.

Production Statistics of Pig Iron, Steel Ingots and Castings for a Period of Years, Page 1750

Buyers Anticipate Delivery

New York, Dec. 24.—The New York Central railroad has put out an inquiry for 1000 to 1300 tons of foundry iron for first quarter shipment to its shops at Elkhart, Indiana and Frankfort, New York. All of this is foundry iron excepting 50 tons of charcoal. Altogether, inquiries are pending in this territory for more than 6000 tons. The Worthington Pump & Machinery Corp. has increased its inquiry for the first quarter and now is negotiating for 2050 tons for its shops at East Cambridge, Mass., and Harrison, N. J. Another melter is in the market for 1000 to several thousand tons. A number of smaller lots are under inquiry.

The outstanding feature of the market is the extent to which consumers are anticipating delivery on first quarter contracts. Every day the sellers are receiving hurry calls for deliveries and in one case a melter already has taken all of his January deliveries. Consumption, therefore, gives every evidence of being well maintained. On eastern foundry iron the market continues firm at $23 base furnace, plus 50-cent silicon differentials. On Buffalo iron the market continues $22 to $23.

Buffalo Market Firm

Buffalo, Dec. 24.—The closing of the year finds pig iron inquiry and sales low. Inquiry ranges between 2000 and 2500 tons, with sales between 1500 and 1800 tons, estimated. The price for No. 2 foundry iron (1.75 to 2.25 silicon) is $23, though $22 and $22.50 was quoted throughout the week. Differentials are being obtained, and the market is firm.

Basic and Foundry Sold

Cleveland, Dec. 24.—A continuance of a fair run of moderate size orders is reported by most of the pig iron makers represented in the northern Ohio group. The seasonal lull has not been so pronounced as might have been expected after the large buying movement so late in the year. Several good tonnages have been in the market; shipments have been going forward in satisfactory volume, and the opinion is general among makers that business will show some improvement soon after Jan. 1. Prices continue on the same level as a week ago; Cleveland makers quote $22.50 to $23, furnace, and this represents the range of the lake furnace price in general. One large producer maintains a price of $22.50, furnace, for shipment from various plants. Among bookings of the week at this figure is one lot of 4500 tons of foundry iron. A lake furnace took around 1500 tons at a range of $22.50 to $23, furnace. One maker has offered to sell foundry iron on a basis of $22, valley, for No. 2 grade, in competition outside this district. Among inquiries of the week on which furnaces submitted figures is one for 6000 tons of foundry iron for the first quarter for a user in central Ohio. Except for this, inquiries for foundry and malleable grades is confined to small lots; with one maker the total amounts to 2000 tons. These are for immediate shipment. A Canton, O., user of basic who was inquiring for 6000 tons is understood to have closed for this with a furnace represented in the northern Ohio group on a basis of $21, valley.

Quiet Market at Present

Cincinnati, Dec. 24.—At the beginning of 1923, now drawing to a close, southern Ohio pig iron was selling around $27.50 and $28, Ironton base and early in April went to $31 to $32, the high point of the year. Today the market is practically at $22.50, base. The lowest level reached was during October when the price reached $21 furnace. Southern furnaces sold at $23 to $25, Birmingham early in 1923 and in April sales were recorded at $27 to $28 the year's high. The lowest price attained during the year was $18.50, although in October when sales were made at that quotation the prevailing market price was $19 base, Birmingham. Current quotations range from $21 to $22 base. Although activity has subsided considerably since the buying movement in November, prices are holding steady, so far as asking prices go. The local seller for the Tuscaloosa furnace during the past week sold a number of carlot shipments at $22 Birmingham base. No one is offering southern iron under $21 base for first quarter delivery. December will be one of the dull months of the year in business volume, while April, May and November will rank among the most active. While buying in small lots features the trade, it is reported that the Globe Stove & Range Co., Kokomo, Ind., closed on its inquiry for 500 tons of northern iron. Some southern Ohio furnaces are well booked up for the first quarter, but none is turning down offered business at the generally prevailing price of $22.50,

Ironton base. It is definitely known a large amount of pig iron remains to be purchased by melters in this district and many who bought last month have signified they will take additional tonnages as soon as inventory has been disposed of. Despite the season of the year and the fact that most foundries are taking inventories shipments are regularly accepted and requests are made for the prompt forwarding of iron due on first quarter contracts.

Season Dull by Comparison

Chicago, Dec. 24.—Because pig iron consumers bought so heavily a month ago the holiday dullness this year has been accentuated. The market is described by a broker as one of "peace and contentment" for the reason producers have a big tonnage on their books and consumers did their first quarter shopping early. In the past week sales have been light. The Kalamazoo Malleable Iron Co. purchased 500 tons of malleable for the first quarter. Most sales and inquiries have been limited to several hundred tons.

Pig iron for December delivery can be had at $23, furnace. For first quarter delivery $23.50 is the going quotation. One selling interest believes a good tonnage for delivery early in the first quarter could be placed at $23, but most melters have bought at $23.50 without question. No sales at $23 are claimed. Increased interest is evident in second quarter iron. A sale of 1000 tons at $24, furnace, for this delivery is noted. At present sellers are reluctant to take business beyond March 31, but their ideas of second quarter iron are at least 50 cents over the first quarter.

Small sales of southern iron have been made in this district in the past week. Some producers continue to ask $21, Birmingham, or $27.01 delivered, Chicago. Charcoal iron is rather inactive, with only occasional carload lots. Low phosphorus is quiet.

Buying Movement Expected

Birmingham, Ala., Dec. 24.—With general resumptions of operations by the middle of the week, Southern furnace interests are anticipating a buying movement. The lull has not been as great as expected though no large tonnage has been disposed of in the last several days. First quarter production is well covered. Inquiries indicate consumers are in need for more iron for first quarter. The quotations are still $21 for No. 2 foundry, though for a week there have been indications of a higher price. The $21 price will probably continue through the year. Stove foundries have been asking about iron in this district and a few orders have been booked from them recently. Local melters will make the holiday layoff short, in some instances only two days. Furnace repairing is going on steadily.

Small Sales Are Rule

St. Louis, Dec. 24.—Typical holiday quietness has descended upon the market for pig iron. Both buyers and sellers are more concerned with details of Christmas preparation than dealing in metal. Sales reported were mainly in small lots for immediate shipment, the total of which was less

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Coke Prices Are Easier

Spread on Furnace Fuel Widens to $3.75 to $4.50—Jobbers Offered Foundry Grade Below $5—Soft Spots in Medium Sulphur

COKE PRICES, PAGE 1697

Pittsburgh, Dec. 24.—Limited activity marks the beehive coke situation from both spot sales and contracts standpoints. Usually spot sales during this period over the turn of the year become more numerous and their absence has been particularly noticeable this past week. Numerous offers of spot tonnages are made since some excess coke is being produced. Quotations as low as $3.75 have appeared and a few odd carloads have been sold at that level, or 10c below the previous low market. Thus the quotable spread on standard blast furnace fuel has widened somewhat, the market now being quotable at $3.75 to $4.50 instead of $3.85 to $4.40, as formerly, taking into account the last contract taken at the $4.50 level involving 3000 tons monthly over the first quarter booked a few days ago. One Ohio blast furnace has asked that shipments be suspended for about a week but it is understood that the coke will probably not appear in the spot market. Coke producers are more or less encouraged over the outlook for first quarter consumption and while some users indicate their intention of filling their needs in the spot market, it is believed that this policy will change about the middle of January when they will place contracts for February and March supplies. By that time it is expected also that coal strike possibilities will be better outlined and consumers will be more anxious to cover. Action still is deferred on the three inquiries before the trade recently aggregating about 25,000 tons monthly for the first quarter, one from an Ohio furnace interest, another from an eastern and one from a western furnace, the latter asking only 4000 tons monthly. Soft spots continue to develop in the medium sulphur coke market on account of mild weather conditions limiting its consumption. Supplies are more free and $3.15 to $3.25 prices fast are supplanting the $3.25 to $3.50 levels recently current. More foundry coke is offered to jobbers at below the $5 market, at least two high grade brands being quoted to them at $4.90 which makes the consumer price $5.15 to $5.25 instead of $5.25 to $5.50 as recently was the case. Some $5.50 prices still remain and from $4.75 to that maximum is considered the going market levels on standard selected 72-hour foundry fuel, although three or four brands still are quoted at $6 to $7. Production, according to *The Connellsville Courier*, for the week ended Dec. 15 was 183,060 tons as compared with 181,020 tons the preceding week, bringing the production for the year to that date of 12,743,390 tons, as compared with 5,269,850 tons in the same period, 1922.

Buyers Inclined To Wait

New York, Dec. 24.—Demand for spot coke is better than is usual at this time of the year. Prices on spot beehive foundry coke range from $5.25 to $5.75, Connellsville as a rule, although some business has been done in special brands at $6.50. Some first quarter and first half foundry coke contracts have been placed at $6.00 to $6.50, Connellsville, but as a rule there is a tendency on the part of a good many consumers who have not yet bought ahead to wait until after Jan. 1, before taking such action. The northern New Jersey by-product coke maker continues to quote $10.91 delivered at Newark and other northern New Jersey points for by-product foundry coke.

Cincinnati Market Quiet

Cincinnati, O., Dec. 24.—Coke prices are holding steady, so far as asking figures are concerned. Probably the only noteworthy transaction in past week was the sale of 12 cars of New River foundry coke to a Chicago user for first quarter delivery. The order specifies four cars a month beginning Jan. 1. Several sellers have negotiated a number of contracts involving sizable tonnages for first quarter delivery. From all indications, specifications for December will fall below the level anticipated earlier in the month. The market for furnace coke is quiet. Wise county foundry coke continues dull, while little Pocahontas coke is finding its way into this market. Demand for New River and Connellsville foundry coke is considered fair.

Consumers Stocks Not Large

Birmingham, Ala., Dec. 24.—The coke market in the South is quiet. Production is 15 per cent under what it was 30 days ago. Coke prices show no improvement and $5 is the average quotation on by-product foundry. The beehive grade commands a little better price. Local consumers do not have a great amount of coke on hand and will have to urge deliveries soon. A few of the larger consumers of coke are to use by-product gas as a fuel after this month, and this will be felt in the coke market.

St. Louis Market Dull

St. Louis, Dec. 24.—Extreme dullness continues to feature the market for coke. The mildest winter in more than two decades has cut down domestic requirements and stockpiles of by-product makers continue to increase. Dealers' stocks are of liberal proportions. Prices remain steady, though there are reports of concessions. Some contracting in a small way is being done by metallurgical users, but the spot demand is slow. Western and southwestern foundries are not figuring as heavily in the buying as usual at this season. An East Side steel interest placed a contract for its coke breeze requirements during 1924, the order specifying 200 tons per month. Smelters in the tristate district are buying small lots, but generally industrial users have filled their needs and are out of the market. Connellsville 72-hour foundry coke is freely offered, with prices ranging from $5 to $7 per ton, according to grade. Additional mines have closed in the adjacent Illinois coal fields.

Pig Iron Satisfactory

(Continued from page 1695)

than 700 tons. The leading producer reported the sale of 100 tons of foundry iron to a Texas melter for first quarter shipment and a similar quantity to a Missouri foundry for shipment through January and February. The only inquiry for foundry iron worthy of note was for 300 tons for first quarter from an Indiana melter. Steelmakers are displaying some interest in supplies, two interests on the East Side having indicated that they are in the market for 5000 tons each, and taking and for repairs and the annual cleanup.

For the most part users are taking in their iron as due, but several have requested delay on quotas due in January until after the fifteenth of that month. On the other hand a number of interests are anticipating part of iron due them in January. Sentiment generally among melters is optimistic regarding the 1924 outlook. A goodly volume of business is in the negotiation stages, and it is expected that heavy orders for finished products will be placed during the early weeks of January. Shipments by the foundries and mills continue.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Dec. 26 1923	Nov., 1923	Sept., 1923	Dec., 1922
PIG IRON				
Bessemer, valley del., Pitts.....	$24.27	25.47	28.27	30.27
Basic, valley	20.00	20.80	25.00	25.00
Basic, eastern del., eastern Pa...	23.50	22.60	25.10	27.40
*No. 2 foundry, del. Pitts.....	23.77	23.77	26.52	27.37
*No. 2 foundry, Chicago.....	23.00	23.30	26.75	28.00
*Southern No. 2, Birmingham...	21.00	19.25	22.75	22.65
*Southern Ohio, No. 2, Ironton.	22.50	22.50	24.90	27.15
**No. 2X, Virginia furnace.....	24.50	25.00	25.50	27.75
**No. 2X, eastern del., Phila..	24.26	23.01	26.21	28.45
Malleable, valley	21.00	20.40	24.60	26.25
Malleable, Chicago	23.00	23.30	26.75	28.00
Lake Superior charcoal, Chicago	29.04	28.65	32.05	35.40
Gray forge, val. del. Pittsburgh	23.27	23.27	26.27	27.12
Ferromanganese, del., Pitts.....	113.79	113.79	114.79	104.92
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh.	42.50	42.50	42.50	36.75
Sheet bars, open-hearth, Pitts....	42.50	42.50	42.50	36.75
Billets, bessemer, Pittsburgh.....	40.00	41.50	42.50	36.75
Billets, open-hearth, Pittsburgh..	40.00	41.50	42.50	36.75
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.00
Steel bars, Philadelphia	2.72	2.72	2.72	2.30

	Dec. 26 1923	Nov., 1923	Sept., 1923	Dec., 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.62	2.62	2.72	2.25
Iron bars, Chicago mills.....	2.40	2.40	2.38	2.35
Beams, Pittsburgh.....	2.50	2.50	2.50	1.95
Beams, Philadelphia	2.72	2.72	2.82	2.25
Beams, Chicago.....	2.60	2.60	2.60	2.10
Tank plates, Pittsburgh.....	2.50	2.50	2.50	1.90
Tank plates, Philadelphia.....	2.72	2.72	2.82	2.25
Tank plates, Chicago	2.60	2.60	2.60	2.10
Sheets, blk., No. 28, Pittsburgh.	3.75	3.75	3.75	3.30
Sheets, blue anl., No. 10, Pitts.	3.00	3.00	3.00	2.50
Sheets, galv., No. 28, Pittsburgh.	4.90	4.85	5.00	4.35
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.70
COKE				
Connellsville furnace	3.75	3.80	4.55	6.90
Connellsville foundry, ovens....	4.75	4.85	5.70	7.85
OLD MATERIAL				
Heavy melting steel, Pittsburgh.	19.00	15.70	18.00	20.00
Heavy melting steel, eastern Pa.	17.00	15.50	16.85	16.70
Heavy melting steel, Chicago...	17.00	13.80	16.55	17.00
No. 1 wrought, eastern Pa....	19.00	17.75	19.00	18.90
No. 1 wrought, Chicago.....	17.50	14.10	18.25	17.25
Rails for rolling, Chicago.....	18.00	15.10	18.30	18.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

Composite Market Average

Representing the Combined Average Prices Per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago.

Dec. 19, 1923	Dec. 12, 1923	November, 1923	September, 1923	December, 1922	December, 1913
$43.00	$43.05	$42.81	$44.64	$40.53	$23.29

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

it is likely they will close on this tonnage shortly after Jan. 1.

A number of foundries are quietly seeking prices on iron for first quarter, and several who have covered their requirements for that period are asking for terms on second quarter iron. Prices quoted by makers in all districts have undergone no revision during the past 10 days or two weeks, but the trend on the base grade in the South is a shade firmer. Furnaces in the North are offering freely in this district, and evidently have liberal tonnages to dispose of. Foundries hereabout continue fairly busy, but are working for the most part on old orders. Several plants will be closed down for a week or two during, or immediately following the holidays, this action having been decided upon in order to complete inventory

Bargain for French Ore and German Coke

London, England, Dec. 13.—According to a dispatch from Frankfurt negotiations have been opened again between representatives of the German industrialists and the leaders of the French Lorraine iron and steel industry for the purpose of executing long time contracts for the exchange of Lorraine iron ore for German coke. These arrangements have no relation to the agreement recently concluded between the French government and the representatives of the Ruhr industry. The contracts now under consideration, it concluded, will be of a purely business character.

Italian engineers have arrived in Dusseldorf to demand a part of the German coal production for Italy. If this demand is granted it will mean the diversion of coal and coke from French Lorraine destinations to supply the Italian requirements.

Arranges Course in Heat Treatment of Steel

Announcement has been made that an evening course in practical heat treatment of steel will be conducted in Cleveland under the auspices of the Cleveland chapter of the American Society for Steel Treating. The course will consist of a series of 20 weekly lectures of one hour each after which 2-hour laboratory periods are scheduled. The first class will be held on Friday evening, Jan. 18, at the mining building of Case School of Applied Sciences, where all meetings will be held. Prof. H. M. Boylston, head of department of metallurgy, Case School of Applied Sciences, has been chosen director of the course. Many of the scheduled lectures will be given by practical heat treating men.

Stack Is Blown In

Witherbee, Sherman & Co. Inc., have blown in their large blast furnace at Port Henry, the smaller furnace now active is to be put out shortly for repairs.

Iron and Steel Prices

SCRAP PRICES, PAGE 1746, WAREHOUSE PAGE 1744, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1748

Pig Iron

Prices per gross ton

Bessemer, valley	$22.50 to 23.00
Bessemer, Pittsburgh,	24.27 to 25.77
Basic, valley	20.00 to 21.00
Basic, Pittsburgh	21.77 to 22.77
Basic, Buffalo	22.50
Basic, del., eastern Pa.	23.25 to 23.75
Malleable, valley	20.00 to 22.50
Malleable, Pittsburgh	21.77 to 24.77
Malleable, Chicago	23.00 to 23.50
Malleable, Buffalo	22.00
Malleable, del., eastern Pa.	24.00 to 25.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry.	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	24.76 to 25.26
No. 1X, Buffalo	24.00
No. 2 foundry, valley	22.00 to 23.00
No. 2 foundry, Pittsburgh	23.77 to 24.77
No. 2 foundry, Buffalo	22.50 to 23.00
No. 2 foundry, Chicago	23.00 to 23.50
No. 2 foundry, Granite City.	26.00 to 27.00
No. 2 foundry, Ironton furnace	22.50
No. 2 foundry, Cleveland, del.	23.00 to 23.50
No. 2 foundry, del., Phila.	23.76 to 24.26
No. 2 foundry, N. J. tidewater	24.13 to 24.76
No. 2X, eastern del., Phila.	24.26 to 24.76
No. 2X, east. N. J. tidewater	24.63 to 25.26
No. 2X, eastern del., Boston.	26.65 to 27.65
No. 2X foundry, Buffalo fur.	23.00 to 23.50
No. 2X, Buffalo, del. Boston.	26.92 to 27.92
No. 2 southern, Birmingham	21.00
No. 2 southern, Cincinnati.	25.05
No. 2 southern, Chicago	27.01
No. 2 southern, Philadelphia.	28.80
No. 2 southern, Cleveland	27.01
No. 2 southern, Boston (rail and water	27.91 to 28.91
No. 2 southern, St. Louis	26.17
No. 2X, Virginia furnace	24.50
No. 2X, Virginia, Phila.	29.77
No. 2X, Virginia, Jersey City	30.04
No. 2X, Virginia, Boston	30.92
Gray forge, eastern Pa.	23.25 to 23.50
Gray forge, val. del., Pitts.	23.27
Low phos., standard, valley	29.00
Low phos., standard, Phila.	29.50 to 30.00
Low phos., Lebanon, furnace	28.00
Charcoal, Birmingham	32.00 to 33.00
Charcoal, Superior, Chicago.	29.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	31.00
8 to 9 per cent	32.50
9 to 10 per cent	34.50
10 to 11 per cent	36.50
11 to 12 per cent	39.00
12 per cent	41.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	41.50
11 to 12 per cent	44.00
12 to 13 per cent	46.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$109.00 to 110.00
Ferromanganese, delivered, Pittsburgh	113.79 to 114.79
Spiegeleisen 19 to 21 per cent furnace or tidewater	38.00 to 40.00
Ferrosilicon, 50 per cent contract freight allowed	75.00
Ferrotungsten standard, cents per pound contained	85.00 to 90.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon, cents per pound contained, delivered	10.50 to 11.25
Imported ferrochrome, 4 to 6 per cent carbon	nominal
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Prices per net ton

Connellsville furnace	$3.75 to 4.50
Connellsville foundry	4.75 to 5.50
New River foundry	11.00 to 12.00
Wise county furnace	5.00 to 5.75
Wise county foundry	5.75 to 6.75
Alabama furnace	5.00 to 6.00
Alabama foundry	5.50 to 6.50

By-Product

Foundry, Newark, N. J., del.	$10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	13.00 to 13.50
Foundry, Granite City, Ill.	13.00 to 13.50
Foundry, Alabama	5.00 to 6.00

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00 to 42.50
Open-hearth, Youngstown	40.00 to 42.50
Open-hearth, Philadelphia	45.17
Bessemer, Pittsburgh	40.00 to 42.50
Bessemer, Youngstown	40.00 to 42.50
Forging, Pittsburgh	45.00
Forging, Philadelphia	50.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00 to 42.50
Youngstown	40.00 to 42.50

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh $51.00

Standard extras, $2.50 per ton over ¼-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.35c to 2.40c
Universal skelp, Pittsburgh	2.35c to 2.40c
Sheared skelp, Pittsburgh	2.35c to 2.40c

Shapes, Plates and Bars

Prices per pound

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.67c to 2.82c
Structural shapes, New York	2.69c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.67c to 2.82c
Tank plates, New York	2.69c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars, soft steel, Philadelphia.	2.67c to 2.72c
Bars, soft steel, New York	2.69c to 2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Bars, rail steel, mill	2.10c to 2.20c
Reinforcing bars, billet, Pitts.	2.40c
Bar iron, common, Phila.	2.57c to 2.67c
Bar iron, common, New York	2.59c to 2.69c
Bar iron, common, Chicago	2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Prices per pound

Hoops, Pittsburgh, under 5 in.	3.00c
Hoops, Pittsburgh, 20 gage, under 1 in.	3.35c to 3.50c
Bands, Pittsburgh	3.00c
Cold finished steel bars, Pittsburgh base	3.00c
Steel shafting, Pittsburgh	3.00c
Cotton ties, bundle 45 lb. Pittsburgh	$1.66

Rails, Track Material

Standard bessemer rails, mill.	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 32.50
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.00c to 3.15c
Spikes, small railroad, Pitts.	3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.10c
Track bolts, Pitts. Standard.	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.10c
Tie plates, Pittsburgh	2.55c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Prices per pound

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples, Pittsburgh	3.45c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Prices per pound

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburg stamping quality	3.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier,	
0.100-inch and heavier, base	5.00c

Sheets

SHEET MILL BLACK

Prices per pound

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago.	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c

GALVANIZED

No. 28, open-hearth, Pitts.	4.90c to 5.00c
No. 28, bessemer, Pittsburgh	4.90c to 5.00c
No. 28, open-hearth, Phila.	5.17c to 5.32c
No. 28, open-hearth, Chicago.	5.19c to 5.34c

BLUE ANNEALED

No. 10, open hearth, Pitts.	3.00c
No. 10, bessemer, Pittsburgh	3.00c
No. 10, open-hearth, Phila.	3.32c
No. 10, open-hearth, Chicago.	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Prices per 100-pound box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$59.20 to 60.20
Six-inch and over, Chicago	55.20 to 56.20
Three-inch, Birmingham	56.00 to 57.00
Four-inch, Birmingham	49.00 to 50.00
Six-inch and over, Birmingham	46.00 to 48.00
Four-inch, New York	60.60 to 61.60
Six-inch and over, New York.	65.60 to 66.60

Standard fittings, Birmingham, base..$110.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

Scrap Is Moving Upward

All Centers Find Prices Higher on Real and Expected Buying—"Sunday Iron" During Holiday Period Will Lessen Demand

SCRAP PRICES, PAGE 1746

Chicago, Dec. 24.—Whether the Illinois Steel Co. has purchased steel grades for its Gary plant is the question of the hour in the iron and steel scrap market here. The Illinois Steel Co. denies buying, and dealers reported to have obtained the business are emphatic in denial. Another portion of the scrap industry is not satisfied with this. At any rate, whether the reported 50,000 tons have been bought at $18.50 for the Gary works, iron and steel scrap prices are moving up again. It is said $17.50 has been paid for heavy melting steel. A user of railroad wrought scrap entered the market a few days ago and now No. 1 wrought is up $1.50 to $17.50 to $18. Prices on all grades are "jumpy." Heavy melting steel is now up $4 over the low of two months ago. If melters are not compelled to enter the market in January dealers will not be able to sustain present levels. Demand for steel grades will be lessened somewhat by the fact that the nine days between Dec. 23 and Jan. 1 will include four days in which 24-hour iron will pile up. The George W. Jenings Co. is offering 650 tons of scrap of various grades.

Cincinnati Prices Are Up

Cincinnati, Dec. 24.—Recent improvement in demand for iron and steel scrap has given place to inactivity. Steel plants and foundries in this district are through buying for the year and it is expected they will not be interested in tonnages until the middle of next month. However, a number of consumers are figuring on tonnage for future delivery. Dealers are taking advantage of the present lull to stock up in anticipation of an early buying movement. Due to activity in other markets, local dealers have marked up their lists on an average of 50 cents a ton. The outlook for increased consumption of heavy melting steel is considered good, since more business is flowing to mills in their territory. While prices have been gaining strength during the past few weeks, they are still a few dollars below the level of a year ago. Railroad offerings are smaller, but they are bringing better prices, because dealers are buying for speculative purposes. The Chesapeake & Ohio and Norfolk & Western railroads are in the market with lists aggregating several thousand tons each.

All Grades Are Higher

Pittsburgh, Dec. 24.—While it is true that a strictly dealers' market does not exist in this district at present, dealers and brokers have shown considerable faith by the relatively high prices they have been willing to pay. An exceedingly strong market prevails and practically all grades are again up 50 cents to $1 per ton and one or two have advanced in even greater measure. Consumers supplying their needs in this vicinity will buy if the price is sufficiently attractive but are finding each inquiry meets a higher price. Recent railroad lists, including that of the Norfolk & Western, have developed some relatively high figures, bids around $19.50 for heavy melting steel failing to obtain the award. A Weirton, W. Va., user recently paid $19 for heavy melting steel and a Monessen, Pa., consumer paid a similar figure on a small tonnage early last week. Both of these would possibly buy more but are having difficulty locating anything below $19.50 since the Carnegie Steel Co. again purchased 10,000 to 20,000 tons and is reported to have paid that figure. Sales of No. 1 cupola cast since the 1500-ton lot went to the Westinghouse Electric & Mfg. Co. at $22, have not been large but no quotation less than that level apparently is available. A nearby producer of hydraulic compressed sheet scrap obtained in the neighborhood of $16.30 f.o.b. its plant from which point the freight rate to Weirton is $1.89, so that even the $18 maximum figure now quoted on that grade is nominal and soon may be minimum. The Pennsylvania railroad is issuing its usual lists aggregating between 40,000 and 50,000 tons, bids on which will close next week.

Buffalo Expects Buying

Buffalo, Dec. 24.—Dealers expect a buying movement in scrap before the end of the year or just after it, which will mean a $19 market for heavy melting steel. Dealers' $18 orders will keep them busy till the middle of January. Mills will carry into the new year one of the lightest scrap inventories on record.

Lull in the South

Birmingham, Ala., Dec. 24.—The lull in the iron and steel scrap market in the South continues as far as buying is concerned or even as to inquiry. Some tonnage is being delivered on old contracts. Quotations are still weak and concessions are heard of. Railroads are offering considerable old material. Heavy melting steel is practically lifeless, the larger consumer not being in the market.

Strong at Cleveland

Cleveland, Dec. 24.—Iron and steel scrap continues strong in this district largely because of continued buying in Pittsburgh and valley territory. Dealers also are taking tonnage whenever favorable opportunity offers, general belief being that demand from users will reach generous proportions shortly after the turn of the year. Purchasing in immediate Cleveland district is largely confined to dealers although consumers are doing a limited amount of quiet shopping, largely to fill out immediate requirements.

Scrap Sales Strong

Boston, Dec. 24.—Scrap iron and steel sales are being well sustained. The American Steel & Wire Co. has been a heavy buyer of melting steel throughout the past week and in some cases is reported to have paid $14.25 per gross ton delivered. The range among dealers at Boston for this grade of scrap is from $13.00 to $13.75 shipping point. Borings and turnings for blast furnace use are moving freely to Pennsylvania at $9.00 per ton on cars shipping point. Improved demand in chemical borings is reported with prices up 50 cents. A Connecticut consumer bought a round tonnage of car wheels at $20.50 per gross ton delivered. No. 1 machinery scrap prices have slid off slightly in the face of declining demand and $21.00 to $22.00 delivered is the present range.

Advances At St. Louis

St. Louis, Dec. 24.—Price advances affecting virtually all items feature the market for iron and steel scrap. Industries are beginning to buy more freely for immediate and future shipment, and dealers are taking strong view of the situation. The present sharp upturn in values found many middlemen short with the result that losses have been general and of formidable proportions. On the other hand dealers who purchased for storage in their yards during the recent depression have an excellent profit.

The present improved demand affects all grades and classifications, but with advances particularly pronounced in steel and steel specialties. Heavy melting steel was marked up $1.75 a ton to $17.50, and advances on the specialties ranged from 50 cents to $1.50 per ton. Iron angle and splice bars are especially strong, being held at $22 to $22.50, and steel splice bars moved up $2 per ton to $18. The call for rails for rolling and miscellaneous rails is brisk, and turnings and borings can be sold in large quantity. The fact is that users are desirous of purchasing much more scrap than dealers will sell.

New York Prices Higher

New York, Dec. 24.—The iron and steel scrap market is featured by more active demand, particularly in steel and turnings. Virtually all the leading eastern Pennsylvania consumers are buying steel at an advance of about 50 cents a ton. With few exceptions, they are paying $17, delivered, for No. 1 railroad steel. Some Pittsburgh district consumers are also figuring here, a buyer at Midland, Pa., paying $19.50, delivered, for heavy melting steel. A Knoxville, Pa. consumer is buying turnings in substantial quantities at $14.50, delivered.

While cast scrap generally is moving slowly, stove plate is being sold in fair quantities. A Harrisburg consumer is paying $17, delivered, and a Rahway, N. J., plant $16.50. Dealers are paying about 50 cents less for delivery to these points. Wrought pipe is in better demand, but city and railroad wrought are quiet. Axles, rails and shafting are moving more freely.

Following are changes in dealers' buying prices, basis f.o.b. New York: No. 1 railroad steel, $13.75 to $14.25; stove plate, $13 to $14; and turnings, $10.50 to $11.

Strip Makers Well Sold

Pittsburgh, Dec. 25.—Substantial tonnages have been and are being placed upon the books of the hot and cold-rolled strip steel makers here, several contracts having been written last week involving up to 1000 tons at a time. So active has the market recently become

that many producers are indifferent about further bookings for the first quarter, having accepted all they care to for the time being. The best feature of the present strip steel activity is that all consuming lines, automotive, typewriter, adding machine, sewing machine, etc., are active and the outlook in each industry is bright for at least the early portion of 1924. Some of the large automobile interests have fully protected themselves for at least three months to come. Latterly this business has been accepted at the full market price of 5.00c base Pittsburgh, on cold and 3.00c base Pittsburgh on hot-rolled. Operations are not averaging more than 65 per cent due to the withholding of some large specifications but since many will be released immediately after the new year opens, operations will be increased in order to discharge obligations which then will be pressing.

Prices Reduced

On Sulphate of Ammonia—Light Oil Distillates Unchanged

New York, Dec. 24.—A reduction of about five points is noted in sulphate of ammonia, with sellers quoting nominally at $2.65 to $2.70 port in double bags, on material for export and $2.70 to $2.85 works, on material for domestic consumption. Demand continues listless in virtually all quarters with little business in sight and further reductions expected.

The situation in light oil distillates is largely unchanged with the smaller sellers offering pure benzol at around 19 cents, works, in tanks and some of the larger interests whose production now is going chiefly into motor fuel, quoting around 22 cents. Ninety per cent benzol is quoted at 18 to 20 cents in tanks and 26 cents in drums, toluol at 23 to 24 cents works in tanks and 30 cents in drums; solvent naphtha at 23 to 24 cents in tanks and 30 cents in drums; and commercial xylol, 27 cents to 29 cents in tanks and 34 cents in drums.

Naphthalene is strong at 8½ cents works for balls and 9½ cents for flakes, with buying for next year on an increased scale. Phenol is steady at 27 cents works in large lots and 30 cents in small lots.

Coke Oven By-Products

	Spot*
Per Gallon at Producers' Plants in Tank Lots	
Pure benzol	$0.19 to 0.22
Toluol	0.23 to 0.24
Solvent naphtha	0.23 to 0.24
Commercial xylol	0.27 to 0.28
Per Pound at Producers' Plants	
Phenol	0.27
Naphthalene flake	0.08½
Naphthalene bals	0.09½
Per 100 Pounds at Producers' Plants	
Sulphate of ammonia	$2.70 to $2.75
Contract	
Pure benzo	$0.22
Toluol	0.24
Solvent naphtha	0.24
Commercial xylol	0.28
Per Pound at Producers' Plants	
Phenol	$0.27
Naphthalene flake	0.08½
Naphthalene balls	0.09½

*Spot distillates are subject to shading.

Semifinished More Active

First Quarter Contracts Closed at $42.50 for Sheet Bars; $40 for Billets —Some Buyers Waiting for Better Price—Wire Rod Demand Light

SEMIFINISHED STEEL PRICES, PAGE 1697

Pittsburgh, Dec. 24.—Closing days of the year are marked with the issuance of a few more inquiries for the various forms of semifinished steel, sheet bars, billets and slabs, and the placing of several contracts. Various producers have closed up on their customers' requirements of billets at $40, Pittsburgh or Youngstown. Some billets and slabs are quoted at $42.50, which is the firm level on sheet bars. A number of sheet bar contracts have been written at $42.50, Pittsburgh, and one or two conversion mills still are shopping around endeavoring to locate a lower figure while others continue to intimate that they will not close until early in January. These contracts involve from 1000 to 5000 tons at a time. A few forging billet inquiries are out but in each case the tonnage is small. Forgers are expected to enter the market within the coming few weeks for larger tonnages, and the usual price quoted at the present time is $45, Pittsburgh or Youngstown. Wire rod commitments are light and interest in this commodity manifested on the part of users so far has not involved any large tonnages. A few regular connections of producers in this locality have closed up on their skelp requirements, the usual figure being 2.35c or 2.40c base Pittsburgh. Many users have tonnage coming to them on old contracts.

Small Lots Taken at $42.50

Cleveland, Dec. 24.—Some additional small lots of sheet bars, billets and slabs for early shipment have been booked here at $42.50, mill. The leading maker has practically committed its output for first quarter with regular customers, and the current market is quiet.

Market In Waiting State

Youngstown, O., Dec. 24.—Little interest was shown last week by consumers to cover for their first quarter sheet bar tonnages at mills in this district. Action in this direction is expected immediately after the new year opens. The price of $42.50, Youngstown on billets, slabs and sheet bars has not been reaffirmed by all producers here although it generally is conceded that business will be closed at this figure. Meanwhile new inquiry for all grades of semifinished is lacking although hope is entertained that more interest will develop in the early part of the first quarter.

Inventories Slow Buying from Warehouses

Detroit, Dec. 24.—Warehouse jobbers in iron and steel report a seasonal slump, not unusual at this time. During the week a fair tonnage of sheets, small structural shapes, bars and bands were sold. Inquiry for material is showing a broader tendency.

Dealers report stocks above the average for this time of the year. The lull, now is due mainly to inventories.

Dealers are cheerful over the outlook for the first quarter declaring many large consumers will be ready in 10 days to begin buying. The continued open weather conditions have aided in some building work, especially of the smaller alterations and repair work, thus aiding the demand for light structural shapes. Prices on all grades are holding steady.

Warehouse Prices Drop

Boston, Dec. 24.—Boston warehouses have reduced prices on No. 28 black sheets from 5.45 cents to 5.00 cents and on No. 28 galvanized sheets from 6.60 cents to 6.00 cents. This brings these grades in line with the blue annealed sheet price which was reduced the first of the month. Warehouse trading has fallen off somewhat during the past week and further price reductions are looked for. Structural shapes and bars have been in fair demand until the last few days. It now appears that consumers are awaiting lower prices.

Wire Buying Heavy

Mills Have Plenty of Business for Next Few Mouths

Pittsburgh, Dec. 24.—Jobber customers of wire products makers have been active of late in placing their 60-day contracts for mixed and straight carloads. Manufacturers likewise have been busily engaged placing contracts for first quarter requirements. Consequently the aggregate sale of wire and wire nails has been heavy, including large lots of small nails. A fair amount of fencing business has been booked in recent weeks. Operations among wire products makers continue to average 70 to 75 per cent of capacity but mill stocks are only 20 per cent of normal for this time of year when spring business is about to be faced. No stocks of small nails are available and makers have been able to accumulate only meager stocks of larger sizes. Prices are unchanged on the basis of 2.75c base Pittsburgh, for plain wire and 3.00c base Pittsburgh, for nails.

Demand Continues Good

New York, Dec. 24.—In a number of instances consumers have placed first quarter contracts for their requirements of wire and there is a general disposition in this product to take action on the first quarter requirements. Current demand for both wire and nails continues good. The market continues firm at 2.75c and 3c base Pittsburgh, respectively. One of the large inquiries in the market is from the New York Central railroad which wants 500 tons of nails for the first quarter on which bids are to be opened on Dec. 28.

1924 Business Comes in Rapidly

Chicago, Dec. 24.—The stream of January and February business in wire and wire products is constantly increasing. Jobbers and retailers show the low condition of their stocks by ordering for delivery immediately after Jan. 1.

Buy More Bars For Autos

Additional Tonnages Being Placed for New Year's Needs—Believed Bar Consumers Must Take Much More to Fill Requirements

BAR PRICES, PAGE 1697

Chicago, Dec. 24.—A contract booked by the leading maker in the past week calls for 12,000 tons of finished material, substantially all bars. This is understood to have come from a large automobile interest. Jobbers and automobile manufacturers have been the most active participants in an increasingly lively soft steel bar market. The hesitancy of most users seems to have disappeared, and along with it has gone the tendency to bargain. The leading maker still is shipping more than it is booking but the leading independent places bookings ahead of shipments. It appears that while tremendous buying has been done in miscellaneous articles manufactured from steel this business has not yet been translated into orders for the plain material. The belief is widely held that the bar, shape and plate markets have not yet reflected the great undercurrent of business that has been placed in products for which finished steel is the basic material. The soft steel bar price is firm at 2.50c, Chicago.

No improvement is yet discernible in bar iron or rail steel bars, the former selling at 2.40c, Chicago, and the latter at 2.30c, mill. One-turn operation is difficult to maintain at times.

Automotive Interests Place Orders

Pittsburgh, Dec. 24.—Automotive interests lately have been active in placing fairly large orders for merchant steel bars. Some additional contracts for round tonnages have been written for first quarter. Several jobbers have ordered combination lots of bars, plates and shapes in lots up to 10,000 tons at a time and have paid full market prices since some tonnages of this nature have been filled with the leading interest, which has firmly maintained 2.40c, on bars and 2.50c on plates and shapes. Independents have been active in booking smaller orders at these levels.

The refined iron bar movement has gained impetus with the recent placing of some orders for first quarter shipment although only a few involved tonnages in excess of single carloads. Quotations vary from 3.25c to 5.00c, base Pittsburgh.

Many Contracts Are Made

Cleveland, Dec. 24.—Heavy contracting of steel bars for first quarter delivery by consumers in this district has been the feature of the week. This has run into a large tonnage since it has included practically all the principal consumers in this territory. A large automobile interest in northern Ohio has closed for its first quarter requirements estimated at 25,000 to 30,000 tons, only a portion of which was bar material. Nut and bolt manufacturers in the Cleveland district in the aggregate have placed an even greater tonnage than that represented by the buying of this automobile builder. In general, the tonnage placed for first quarter by individual consumers is larger than that specified by them for the first quarter of the year, showing the expectation of increased consumption. All the bar contracts closed in this district carried the full price of 2.40c, Pittsburgh. The common tendency of prices is toward greater firmness. This is apparent in hoops and bands and cold-rolled steel where deviations from 3.00c, Pittsburgh, recently have been in evidence. Contracts for hard steel bars and shapes for material to be delivered after Jan. 1 have been placed usually at 2.10c, Pittsburgh.

Railroad Wants 5000 Tons

New York, Dec. 24.—Numerous consumers in this territory have closed contracts for their first quarter steel bar requirements. In the majority of cases, however, there is a disposition to postpone action and a good many buyers think they can do well by buying currently during the first quarter. The largest inquiry in this territory in some time involves 5000 tons of bars for the New York Central railroad for delivery over the first quarter. On this inquiry bids will be opened Dec. 28. The market generally continues 2.40c, base Pittsburgh.

Cold Drawn Schedules Better

Pittsburgh, Dec. 24.—Bookings for first quarter by the cold-drawn bar finishers already are heavy and schedules are being lined up for the first quarter. Some large automotive interests recently figured in an important way in this market, placing several round tonnage lots for shipment in first quarter. When tabulations are made, shipments for the past year will probably exceed the previous year's by 50 or 60 per cent and from present expectations 1924 will show a similar gain over 1923. Automotive and other consuming lines are protecting themselves and numerous contracts have been written during the past week or two, some involving 1000 tons or more at a time. The price is unchanged at 3.00c, base Pittsburgh, although in certain directions freight equalizations have taken place to meet competition.

Most Bolts, Nuts Bought For 1924 Shipment

NUT AND BOLT PRICES, PAGE 1748

Pittsburgh, Dec. 24.—Shipments of nuts, bolts and rivets are light since most of the business in the hands of makers here is for shipment after Jan. 1 to apply on contracts recently booked for first quarter requirements of jobbers and users. These contracts lately were taken on the bases announced the first week in December, namely 2.90c base Pittsburgh, for rivets and 60 and 10 off for large machine bolts. Several plants have practically obligated their entire output for first quarter on the basis of present operations but have hope of increasing schedules.

Business Still on Upgrade

Chicago, Dec. 24.—Makers of bolts and nuts continue to receive heavier specifications against contracts and the improvement evident for two weeks continues. One plant in this district is operating at capacity. Automobile makers have become heavy buyers, it is understood. Implement manufacturers still are taking less than one-third of normal. Bolt and nut prices continue firm at the increased level.

Over 40,000,000 Tons of Iron Ore on Hand

Cleveland, Dec. 24.—Blast furnaces in the United States consumed 4,441,477 tons of Lake Superior iron ore in November, as compared with 4,800,571 tons in October, according to figures compiled by the Lake Superior Iron Ore association. The tonnage used in November, 1922 was 4,380,996. Ore at lower lake docks and in furnace yards Dec. 1 amounted to 44,004,201 tons. The association gives the following comparisons in detail:

	Total
Ore consumed in October	4,800,571
Ore consumed in November	4,441,477
Decrease in November	359,094
Ore consumed in November, 1922	4,380,996
Ore on hand at furnaces Dec. 1, 1923	34,079,961
Ore on Lake Erie docks Dec. 1, 1923	8,756,505
Total at furnaces and Lake Erie docks Dec. 1, 1923	42,836,466
Total at furnaces and Lake Erie docks, Dec. 1, 1922	44,004,201

To Release Hoop Tonnage

HOOP PRICES, PAGE 1697

Pittsburgh, Dec. 24.—New spot business in hoops and bands is light and specifications are slim, but a fairly large aggregate tonnage has been taken under contract for the first quarter. Numerous tonnages are scheduled to be released after the first of the year, buyers being anxious to avoid large inventory stocks, the list including some of the automotive parts makers. Recently the market has assumed more firmness at the 3.00c, base Pittsburgh, minimum and from 3.00c to 3.15c now is quoted on regular hoops and bands. The 10-inch mills of makers here are well scheduled for the first quarter but the narrower mills are not so well fixed. On narrow sizes higher prices have to be obtained because of the limited production possibilities, and from 3.25c to 3.50c is quoted.

Export Trading Falls Off

New York, Dec. 24.—While the past few days have been dull, warehouse trading for the month thus far has exceeded the expectations of most jobbers. The listlessness of the past few days was chiefly in the export market, a number of the leading exporters having practically suspended business. It is doubtful if much activity will be noted in this quarter until after Jan. 1. Prices are steady, with the tendency, if anything, upward.

Canadian Output Falls

Toronto, Ont., Dec. 22.—Production of pig iron in Canada during November, was 62,202 tons, or 11,396 tons below the October output of 73,598 tons, according to the Dominion bureau of statistics.

Production for the 11 months ended November, was 820,396 tons, as compared with 383,057 tons during the corresponding period of 1922 and 554,437 tons in 1921.

Steel ingots and castings aggregated 54,674 gross tons in November and was a drop of 12,822 tons from the 67,496 tons produced in October. Of this tonnage, 51,426 tons was steel ingots and 3,248 tons was steel castings. Production of ingots and castings for the 11 months ended November was 843,522 tons. This output was 48 per cent greater than for the corresponding period of 1922, and was 26 per cent above the tonnage produced in the same period in 1921.

Furniture Shipments Drop

Washington, Dec. 24.—Shipments of steel furniture in November from stock dropped to $1,339,425 from $1,365,600 in October, according to reports received from 22 manufacturers by the department of commerce. November shipments are valued at $135,115 higher than for the corresponding month last year. The following figures compare the shipments for the first 11 months of 1923 and 1922 as reported by 22 manufacturers:

	1923	1922
January	$1,362,470	$ 983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,058,382
May	1,506,072	1,056,735
June	1,401,950	1,015,463
July	1,247,605	945,768
August	1,345,147	943,087
September	1,273,259	1,062,495
October	1,365,600	1,227,447
November	1,339,425	1,204,310

Ohio Foundries Merge

The American Foundry & Casting Co. and the Advance Foundry Co., both of Dayton, O., have been consolidated, the official and working organization of the former being connected with the Advance company.

J. M. Green, present sales manager of The American Foundry & Casting Co. will occupy that position with the Advance company. Both companies have manufactured heavy, medium and light gray iron and semisteel castings for about 25 years.

Combine Branch Offices

Cleveland branches of Westinghoue Electric & Mfg. Co. and Westinghouse Lamp Co. have consolidated their sales and service departments and warehouses in a 5-story building, called the Westinghouse Electric building.

The building is equipped for complete and efficient service to the electrical trade, the latest types of equipbent for repairing and rebuilding electrical apparatus of all kinds being installed. In addition to a large stock of standard industrial equipment, supplies and merchandising items, a supply of renewal parts will be carried in the warehouses. The plant contains 14,500 square feet on each floor, and is of brick and concrete and flat slab construction.

The New York, Ontario & Western railroad closed down its shops at Middleton, New York, Dec. 22, for a period of 10 days.

Plate Market Is Brighter

New Placements Increasing, Though Tonnage Lacks Volume—Railroad Business Coming Out—Prices Firmer

PLATE PRICES, PAGE 1697

Chicago, Dec. 24.—Users of steel plates are beginning, in a small way, to protect themselves on their raw material and as a result a number of 200 and 300-ton lots have been placed on makers' books in the past week. The leading maker is said to have booked the plates required for the Cotton Belt and Chicago & Alton railroad freight cars placed recently. Some oil storage business that appeared imminent a few days ago now has been deferred until January. The leading maker still is shipping more tonnage that it is placing on its books but is satisfied with its acquisition of new business. The placement of the 10,000 Southern Pacific railroad freight cars, which is expected daily, will call for at least 50,000 tons of plates. One maker recently equalized the Pittsburgh price in bidding east of Chicago. The plate quotation is 2.60c, Chicago.

Large Inquiries Are Rare

Pittsburgh, Dec. 24.—New inquiries for large plate tonnages are rare, typical oil storage tank requirements being confined to lots of one, two or three tanks each involving 450 or 500 tons. Prospective tonnage for placement shortly after the first of the year is large, however, according to present indications, and the business referred to involves oil storage tanks, barges, gas holders, boilers and crane work. Material for most of the cars and locomotives now on order, however, has already been placed with the steel mills. The plate price is unchanged at 2.50c, base Pittsburgh, with more buyers willing to pay that figure than was the case a few weeks ago.

Outlook Is More Hopeful

Cleveland, Dec. 24.—New buying in plates from miscellaneous sources is increasing and the outlook is more encouraging. Orders for large tonnages being placed in this district, however, are the exception. A number of good prospects are before the market. Two vessels still are being figured upon by lake yards. A large number of locomotive inquiries are in sight and considerable tonnage is expected from this source from time to time although orders have been coming out very slowly. An inquiry for oil stills calling for 300 tons is in the market. Fabricators in this territory are making up their bids this week for the 3000 tons or so covering a water line for the city of Denver, the inquiry for which was reported in last week's IRON TRADE REVIEW. Less is heard of price weakness in plates. The market with the larger producers remains 2.50c, base Pittsburgh, although some of the smaller mills still will shade this on attractive tonnage.

Complete Reorganization

The reorganization of the Arcade Malleable Iron Co. has recently been completed. The company now controls the plant of the Springfield Malleable Iron Co., Springfield, Mass., in addition to the Arcade plant at Worcester, Mass. The new officers and directors are as follows: H. P. Blumenauer, president, Frank A. Drury, vice president, J. Verner Critchley, vice president, William J. Conlon, treasurer, John M. Collins, George A. Gaskill, Bowen Tufts, Frank J. Weschler, and Arnold Whittaker.

Germans to Work Longer

Dusseldorf, Germany, Dec. 11.—The Bochumer Verein which belongs to the Stinnes group, expects to resume operations at its iron and steel plant this week on a 10-hour shift for noncontinuous operations instead of eight hours as heretofore. Two thousand men will be taken on immediately and 6000 more within a week or so. No definite agreement has been reached with the labor unions to work longer hours in the iron and steel industry, but the foregoing indicates the trend of events.

The Association of Christian Unions, the second largest group of coal miners' unions in the Ruhr, has also agreed to return to their regular tasks immediately. It can, therefore, be assumed that work will now begin generally in the Rhur.

Refute Rate Complaint

Washington, Dec. 24.—Holding that shipments of steel plates from group A freight territory in central Pennsylvania to the Pacific coast in 1920 were not designated as "ship plates" at the point of origin and, therefore, were not entitled to a special combination rate of $1.075 for shipbuilding material, Examiner Henry B. Armes, in a tentative report to the interstate commerce commission has asked that the complaint of R. L. Sabin, receiver for the Overmire Steel Construction Co., Johnstown, Pa., be dismissed. It was also held that certain of these shipments were undercharged by the defendant carriers.

Postpone German Meeting

Berlin, Dec. 14.—The general meeting of the German Foundrymen's association, which was to have taken place Dec. 8 and 9 in Hanover, has been postponed indefinitely owing to the present unsettled political and economic conditions, especially in relation to the Rhineland and Westphalian industry.

The Cleveland Hardware Co., Cleveland, has applied to the Milwaukee circuit court for a receivership of the Ogren Motor Car Co., Milwaukee, which has been manufacturing six-cylinder passenger automobiles for the last few years. Fred G. Smith, formerly of Cleveland, is president.

Concrete Demand Holds Up

Heavier Projects Scheduled for Letting After Jan. 1 Take Interest of Market—Small Tonnage Lots Continue in Good Volume

REINFORCING BAR PRICES, PAGE 1697

Chicago, Dec. 24.—Reinforcing concrete bar selling interests expect several hundred tons of bars to go with each of the large structural steel office and hotel structures upon which bids will be opened early in January. Probably the first of these jobs will be the Tribune Tower, for which the foundation bars already have been purchased. Indiana opened bids Dec. 18 on road work requiring 1700 tons of bars and on Jan. 3 will open further bids. The total Indiana highway project approximates 6000 to 7000 tons of bars. It is said the Highland Iron & Steel Co., Terre Haute, Ind., is seeking a large part of this business. The Continental Can Co. job requiring 600 tons, and the Sante Fe railroad building, at Topeka, Kans., calling for more than 700 tons, are expected to be awarded soon. The ruling concrete bar price is 3.00c, Chicago.

Deferred Action Is General

Pittsburgh, Dec. 24.—Deferring action has become general in the concrete bar market but the trade expects definite orders will be placed for large tonnages after Jan. 1. Included in the list pending is a 500-ton lot for a building in the East for a Pittsburgh interest. Projects scheduled to develop early in the new year include a stadium for West Virginia university and one for University of Pittsburgh. Formal bids have not as yet been asked on these. Considerable road work is scheduled for early placement involving about 200 tons of bars. The market price on concrete bars is unchanged at 2.40c, base Pittsburgh, although in certain directions concessions under that level are obtainable, mainly where stocks are being liquidated.

Holiday Lull Apparent

Cleveland, Dec. 24.—Little trading was done in the local reinforcing bar market during the past week. Buyers continue to hold off purchases until after Jan. 1. The only new inquiry calling for 100 tons or more was that of the German Consolidated Newspaper Co., Twelfth and Oregon streets. New steel bars are firm at 2.40c, base Pittsburgh. Prices on reinforcing bars out of stock are firmer, with 2.75c, base Pittsburgh, not being shaded. Rail steel bars continue to be sold at 2.10c, mill, with little tonnage coming into the market to test the strength of that quotation.

CONCRETE CONTRACTS PLACED

Awards this week	**605 tons**
Awards last week	**3,245 tons**
Awards two weeks ago	**2,165 tons**

200 tons, Junior high school, South Bend, Ind., to Truscon Steel Co.
175 tons, foundations for Ford Motor Co. plant, St. Paul, to C. A. P. Turner.
130 tons, Security Van & Storage Co. warehouse, Duluth, to Kalman Steel Co.
100 tons for building for New York Telephone Co., 124th street, Lexington avenue, New York, to Concrete Steel Co.

CONCRETE CONTRACTS PENDING

100 tons, German Consolidated Newspaper Co., Twelfth and Oregon streets, Cleveland; pending.

Pipe Mill

Backlogs Are Depleted—Utilities Continue To Buy Cast Grade

Pittsburgh, Dec. 24.—Lapweld pipe backlogs are badly depleted although pipe producers in Pittsburgh, Youngstown and Wheeling districts all have a fair amount of buttweld business booked. New orders for single carloads, 50 or 100 tons at a time, are noted. Larger tonnages are placed occasionally such as one booked by a large interest for export involving 1500 tons of oil country pipe. New domestic business in oil country goods still is limited although a better feeling exists among buyers and sellers. All are cheerful concerning prospects in the new year when large inquiries for line pipe, casing, etc., will be issued. Jobbers' stocks generally are below normal. No price changes have been recorded and none are contemplated for the immediate future.

Higher Prices in Prospect

Chicago, Dec. 24.—Cast iron pipe prices are strong. One selling interest believes the present levels of $51 to $52, Birmingham, for 4-inch and $47 to $48, Birmingham, for 6-inch and over, will not hold many weeks. Pipe makers seem booked about 90 per cent for the first half of 1924. So far in December some have booked about two months' production. Fear is expressed that high prices may frighten some 1924 business. Most forward buying has been done by utilities, and many companies have yet to enter the market. The United States Cast Iron Pipe & Foundry Co. has taken 3000 tons at Toledo, O., and Cincinnati and between 2000 and 3000 tons at Omaha for the Union Pacific railroad.

City Lets Large Contract

Cincinnati, Dec. 24.—The United States Cast Iron Pipe & Foundry Co. has been awarded contract to supply Cincinnati with approximately 10,000 feet of 10 and 16-inch pipe. The company's bid was $94,165.50, while the city engineer's estimate was $110,000.

Plants Down for Holidays

Birmingham, Ala., Dec. 22.—Cast iron pipe makers in the Birmingham district are getting large orders and will resume operations after the holidays with business booked to warrant capacity production for several months. The American Cast Iron Pipe Co. will resume operations next Monday and the United States Cast Iron Pipe & Foundry Co. will be making pipe again next week. Several sanitary pipe plants will be producing again Wednesday with the bulk of the works getting back to activity next week. Repairing is necessary in some of the pressure pipe plants and this will be done during the week.

Municipal Orders Expected

New York, Dec. 24.—The near approach of the holiday season has tended to check the substantial private buying of cast iron pipe. Business for this season of the year has been holding up unusually well, and is expected to improve after the first of the year. It is believed there will be a sharp increase in municipal buying as a number of cities are at present holding off, pending changes in administration. Prices are unchanged.

CAST IRON PIPE PLACED

2000 to 3000 tons, work for Union Pacific railroad at Omaha, to United States Cast Iron Pipe & Foundry Co.
1800 tons, Cincinnati, to United States Iron Pipe & Foundry Co.
1200 tons, work in Toledo, O., to United States Cast Iron Pipe & Foundry Co.

CAST IRON PIPE PENDING

1000 tons, Metropolitan Utilities Co., Omaha; bids in.
500 tons, work for New Holstein, Wis.; bids in.

Alloys Are Active

Ferromanganese Inquiries to Check Market But Some Buying

New York, Dec. 24.—Active business has been transacted in spiegeleisen and altogether new sales involve about 4000 tons, both for nearby and first quarter delivery. Further inquiries are pending. The market is $38 to $40, furnace, on 20 per cent metal.

Some inquiry for ferromanganese continues before the trade but actual business has been small during the past week and as a rule there is a tendency to postpone action. The price on English ferromanganese continues $110 duty paid tidewater.

No changes are reported in the prices for the special ferroalloys. Contracting is proceeding for 1924 requirements on the basis of the published quotations.

Few Inquiries Are Closed

Pittsburgh, Dec. 24.—Some recent negotiations for ferromanganese which have featured the ferroalloys market do not have much foundation other than the desire to obtain prices or to check up quotations. Most of the larger consumers have protected themselves on tonnage and only a few will have to buy in the near future. One interest in the Wheeling district which bought a single carload a few weeks ago from an eastern Pennsylvania steelworks furnace at $107.50 has tried to duplicate that figure on 1000 to 1500 tons. It is understood, however, to have enough material on hand to last well into January and may not buy until that time. The Andrews Steel Co. put out an inquiry for 300 tons but may not close since it has enough material on hand or coming in. The Donner Steel Co., Buffalo, however, is negotiating for 1000 tons and this order may be placed any day. Importers continue to quote $110 seaboard base, which price is likewise quoted by one domestic maker against the other's figure of $109, seaboard base, at which last level a few small orders lately have been accepted.

Some spiegeleisen orders up to 500

or 1000 tons at a time have been taken at $38, furnace, for the 19 to 21 per cent material and at $37 for the lower grade. Most inquiries now have been cleaned up except for an occasional single carload requirement on which slightly higher prices are sometimes sought.

Ferrosilicon, 50 per cent, and ferrochrome, 0.6 to 0.8 carbon, have been fairly active of late as regards the first quarter and in a few cases first half, and $75 freight allowed on the former and 10½ cents on the latter are the prevailing figures. Ferrovanadium, ferrotungsten, etc., have not shown much life but are firm at $3.50 to $4, and at 90 cents, respectively.

Spiegeleisen Is Up $1

Chicago, Dec. 24.—Carload sales are being made of ferromanganese at $110, Baltimore. A Chicago consumer and a Milwaukee consumer each are seeking one carload. Spiegeleisen has been advanced $1 a ton to $48.50, delivered Chicago. This makes the furnace quotation $40, compared with $39 recently. Demand for spiegeleisen is comparatively light. Activity in bessemer ferrosilicon is looked for shortly after the turn of the year.

Tin Plate

Users Practically All Have Covered for First Quarter

Pittsburgh, Dec. 24.—One of the last of the oil companies to cover on its tin plate requirements came in for a fairly large tonnage this past week and now all the canmakers as well as oil country users of the plate have practically covered their needs for the first quarter and in many cases for the first half. While the American Sheet & Tin Plate Co. may late in the first quarter find loop holes for the demands of more users due to various contingencies that may arise, as it stands now it is obligated for all the tin plate it can produce until June 30 of next year, operating on a 90 per cent or slightly better basis. Last week this company operated 97 per cent of its tin mills practically all week but this week the figure will be considerably less owing to the holidays, when spasmodic attendance on the part of hot mill workmen is the usual rule. Only a few men reported, today and tomorrow the plants will be shut down to celebrate Christmas and since some celebrations will extend over until Wednesday, little or nothing but loading into railroad cars will be done until Thursday or Friday. Tin plate stock lists are not abnormal for this season, it having been comparatively easy to dispose of the more acceptable stock plates during many weeks past although price concessions have had to be made. The open market figure, however, continues unchanged and firm at $5.50 per base box of 100 pounds, Pittsburgh.

A petition in bankruptcy has been filed against the Acme Foundry Co., 308 North Henry street, Brooklyn, N. Y. Robert C. Lee has been appointed receiver in bond of $5000.

Sheet Contracts Increase

New Business Considerably Improved Over Month Ago—Shipments 50 to 100 Per Cent Better—Prices Show More Firmness

SHEET PRICES, PAGE 1697

Pittsburgh, Dec. 24.—Reports from sheet sellers in various sections of the country show a vast change from what they were a few weeks ago, in that they are cheerful as to business in hand and in prospect. This is decidedly unusual for this time of the year and specifications as well as shipments are anywhere from 50 to 100 per cent greater than a month ago. An increasingly large number of contracts are being written for various grades of sheets, particularly those used in the automotive industries, and not only that but users here and there are asking that shipments be allowed to come forward as soon as possible. Some automobile manufacturers would be willing to accept full-finished sheets between now and the end of the year despite inventories, but in many cases these cannot be produced until January. Others, in the hope of avoiding the inclusion of large tonnages in their inventories are releasing a great deal of tonnage for shipment between Dec. 27 and Dec. 31; more, in fact, than possibly can be loaded between now and the end of the year. Sheet orders lately have been coming from practically every consuming line, in addition to the automotive industries, such as stove and range manufacturers, agricultural implement makers, and freight and passenger car builders, car roofers and repairers. Jobbers' specifications have been varied and heavy in the aggregate, running individually from 100 to 1000 tons or more. One specification from an automotive parts maker recently placed for shipment in January and February, this week was ordered forwarded in January and another lot later is to be purchased for the February requirements. Operations of the American Sheet & Tin Plate Co. last week were approximately on the same basis as the preceding one, 82 per cent, while independents maintained schedules around 70 per cent on the average. These figures will receive a severe setback during the present week and next because of holiday celebrations. Prices are firming up considerably and while slight concessions may be made by one or two small producers of blue annealed sheets, the 3.00c price is general, as is 5.35c base Pittsburgh, on full-finished. As yet 3.75c to 3.85c applies on black and 4.90c to 5.00c, base Pittsburgh, on galvanized, but the minimums in each case are becoming more and more difficult to locate.

Heavy Buying Is Forecast

New York, Dec. 24.—Active buying for the first quarter has featured the sheet market in this district during the past week, and these developments appear to indicate expectations of heavy consumption during that period. The market is strong and in most cases the full prices, 3c base Pittsburgh on blue annealed, 3.85c on black and 5c on galvanized have been obtained. Some of the smaller mills have shaded these prices by $2 a ton. The heaviest buying has been by jobbers, electrical interests and refrigerator manufacturers. In most cases the consumers placed actual specifications for the first quarter contracts instead of blanket contracts. Some foreign orders for sheets have been placed during the past week, mostly galvanized sheets for Japan, Argentina, Cuba and Porto Rico. Japan practically has stopped buying light gage black sheets and no large demand of this character is expected from Japan until it develops as to what will be done as to the duty on steel imported into Japan after March 31. Incidentally, it is believed that much of the recent heavy buying was in excess of actual requirements and was done because of the desire to get the sheets into Japan to take advantage of the duty-free period.

Well Sold For First Quarter

Chicago, Dec. 24.—The leading independent maker of steel sheets in the Chicago district is now about two-thirds booked for the first quarter of 1924. Business continues to flow in without the necessity of urging and each week sees softness in price less evident. At present sheet buyers are able to get spot shipments, but the end of this condition seems to be in sight. The ruling quotations on steel sheets in the Chicago district are 3.00c, Pittsburgh, for blue annealed, 3.85c, for black, and 5.00c, for galvanized.

More Tonnage Placed

Youngstown, O., Dec. 24.—Sheet consumers are beginning to place tonnage for first quarter at a more attractive rate, and business in this direction has been shared by practically every maker. Producers here have more confidence as to the outlook for better business during the early part of 1924. One maker reports sufficient black tonnage in hand to carry his mill schedule well through the first three months of next year. Others, however, are not in such a comfortable position although production schedules in a number of cases are favorable for the first three weeks in January. While the price structure lacks firmness still there is more of a tendency to get back onto the full market basis as unfilled tonnage continues to gain momentum. Some producers have not been attracted to the policy of maintaining full production by taking low price tonnage. Competition continues to reflect minimum prices of 3.75c on black, 2.90c on blue annealed and 4.90c on galvanized, base Pittsburgh, although in a majority of cases full prices are being obtained on forward tonnage. A large consumer of sheets in the Detroit district is understood to have closed on his recent requirement of 30,000 tons, the business being distributed among several makers. While the business was closed on a competitive basis still the mills absorbing the tonnage now have a backlog and hence have fortified their position from the standpoint of future quotations.

Shape Inquiries Heavy

Awards Slump as Holidays Approach but Unusually Heavy Tonnage Is Expected Shortly—November Awards Show Increase

STRUCTURAL SHAPE PRICES, PAGE 1697

Washington, Dec. 24.—November sales of fabricated structural steel, totaling 120,858 tons, showed an increase of 9166 tons over the sales of October, the low month of the year. The November sales were reported by 153 companies having a monthly capacity of 223,472 tons, or 54 per cent of capacity, according to figures issued by the department of commerce. Operations increased six per cent over those of October when bookings were at 48 per cent of capacity.

For comparative purposes the figures below are prorated to obtain an estimated total for the United States, of a capacity of 250,000 tons per month from April, 1922, through November, 1923. Earlier figures are based on the reports received by the Bridge Builders and Structural society.

Monthly structural awards showing actual tonnage booked, per cent of capacity reached and the estimated total bookings of the companies reporting are as follows:

	Actual bookings tons	Per cent of capacity	Estimated total bookings
January, 1922	72,100	40	100,000†
February ...	78,700	43.5	108,750†
March	139,300	77	192,500†
April	200,968	87	217,500†
May	185,065	80	200,000
June	168,894	73	182,500
July	158,012	69	172,500
August	156,559	68	170,000
September ..	146,827	64	160,000
October ...	133,037	58	145,000
November ..	112,367	49	122,500
December ..	138,737	60	150,000
January, 1923	173,294	75	187,500
February ...	184,887	80	200,000
March	220,400	96	240,000
April	186,117	81	202,500
May	131,875	57	142,500
June	118,117	51	127,500
July	117,563	51	127,500
August	134,431*	58	145,000
September ..	121,096**	52	130,000
October	111,692***	48	120,000
November ..	120,858****	54	135,000

†Figures of Bridge Builders and Structural society revised on basis of 250,000 tons capacity.

*Reported by 176 firms with a capacity of 232,857 tons.

**Reported by 174 firms with a capacity of 232,107 tons.

***Reported by 169 firms with a capacity of 231,257 tons.

****Reported by 153 firms with a capacity of 223,472 tons.

Inquiries Heavy; Awards Few

Pittsburgh, Dec. 24.—Inquiries for structural shapes and requests for bids upon projective buildings are numerous but awards continue to be confined to small lots below 500 tons. Action on most of the inquiries is definitely postponed until after the first of the year, only a few small contracts being placed within the past week or 10 days. Occasionally larger tonnages are noted but these are rare in immediate vicinity of Pittsburgh. The plain material price stands unchanged at 2.50c base Pittsburgh. Buyers now are not as sure as they were a few weeks ago that they will purchase at lower figures. Some first quarter jobber contracts have been taken at the full market price. The number of transmission tower jobs to be placed after the first of the year is growing and already involves a fairly large tonnage. The public service commissioners at Harrisburg, Pa., have ordered the replacement of the West Washington street bridge at New Castle, Pa.

January Estimates Are Growing

Chicago, Dec. 24.—Structural steel market prospects continue more auspicious than those in any other line of finished material. Structural steel makers believe that once buying starts in January, a tremendous tonnage will come out almost simultaneously. It is stated definitely that bids for the Tribune tower, which will require about 10,000 tons, will be opened Jan. 15. The 6000 tons to go into the Lake Shore Athletic club building is additional tonnage for January. A utility company may shortly take bids on 2000 tons for transmission towers. The largest letting of the past week is the 3500-ton Donaldson building, St. Paul, which went to the Minneapolis Steel & Machinery Co. The plain material price continues 2.60c, Chicago.

Holidays' Slow Market

Cleveland, Dec. 24.—Little activity was noted in the structural shape market last week as approaching holidays caused a slackening of interest on the part of buyers. Heavy tonnages are expected to be awarded soon after Jan. 1. Jones & Laughlin Steel Corp. was low bidder on 500 tons required for a building addition by N. Wile Co., Buffalo. Lundoff-Bicknell Co. was awarded general contract for the National Biscuit Co. building. Plain material price continues firm at 2.50c, base Pittsburgh.

Award 2500-ton Lot

Boston, Dec. 24.—Structural shape business looks more hopeful for January, with most buyers postponing closing action until then. The American Bridge Co. took 2500 tons of shapes for a power house at Fall River, Mass., this being the largest award of the week. Plain material continues to be placed in this district at 2.40c, base Pittsburgh.

Substantial Business Still Going

New York, Dec. 24.—Substantial business in the structural shape market was placed during the past week, and a heavy tonnage continued to be figured. The outlook for the first quarter appears unusually bright. It would not prove surprising to many in the trade if business in the first three months exceeded that of the corresponding period last year, which was the best ever recorded. Plain material prices are firm at 2.50c, Pittsburgh, while fabricated material prices are moving upward.

The largest single order placed in this market for the past several weeks was that of 14,000 tons for the Pictorial Review building, the contract for which went to Levering & Garrigues. The plain material will be purchased from Bethlehem Steel Corp. An additional 8000 tons of structural material will be needed for the Central of New Jersey railroad bridge over Newark Bay, N. J.

STRUCTURAL CONTRACTS PLACED

Building awards this week ..... 47,400 tons
Building awards last week..... 33,069 tons
Building awards two weeks ago.... 34,500 tons

18,000 tons, American Telephone & Telegraph Co., building, New York, to American Bridge Co. through Post & McCord.

14,000 tons, Pictorial Review building, New York, to Levering & Garrigues, plain material to Bethlehem Steel Corp.

3500 tons, Donaldson building, St. Paul, to Minneapolis Steel & Machinery Co.

2500 tons, power house, Fall River, Mass., to American Bridge Co.

2400 tons, Ravitch loft building, New York, previously reported placed, to Hinkle Iron Works.

1300 tons, loft building at West Thirty-sixth street, New York to Hedden Iron Construction Co.

1200 tons, Board of Trade building, Kansas City, to Kansas City Structural Steel Co.

1000 tons, school, Bronx, New York, to A. E. Norton, Inc.

850 tons, addition to American Locomotive Co. building, Schenectady, N. Y., to McClintic-Marshall Co.

650 tons dormitory for Barnard college, New York, to Harris Structural Steel Co.

400 tons, Turner building, New York, to Hedden Iron Construction Co.

950 tons, bridge repairs by Great Northern railroad, to American Bridge Co.

500 tons, Salvation Army building, Pittsburgh, to Jones & Laughlin Steel Corp.

150 tons, office building, East Thirty-seventh street, New York; to Harris Structural Steel Co.

STRUCTURAL CONTRACTS PENDING

8000 tons, additional for lift span for Central of New Jersey, Newark Bay, N. J.; pending.

3000 tons, Madison high school, New York, to Turner Construction Co.

3000 tons, new plant for Ford Motor Co., Louisville, Ky.; bids to be taken shortly.

2700 tons, schools No. 201, 80 and 197, Brooklyn, each involving 900 tons, specifications out shortly.

1700 tons, loft building, 70 West Thirty-sixth street, New York; pending.

1500 tons, loft for Schroeder & Koppel, New York; pending.

1500 tons, school 109 Queens, New York City, specifications out shortly.

1000 tons, loft and office building, Broadway and Thirty-second street, New York; pending.

900 tons, French apartment, Thirty-fifth street and Park avenue, New York; pending.

800 tons, telephone building, Yonkers, N. Y.; pending.

800 tons, addition to office building, Vanderbilt and Forty-second street, New York; pending.

800 tons, National Bible institute, Fifty-fifth street, New York; pending.

500 tons, addition to factory of N. Wile Co., Buffalo, N. Y.; Jones & Laughlin Steel Corp. low bidder.

300 tons, National Biscuit Co. building, Cleveland; Lundoff-Bicknell Co., general contractor.

300 tons, loft building, 36 East Thirtieth street, New York; pending.

Tonnage not stated, Masonic temple, Tacoma, Wash.; bids to be taken soon.

Tonnage not stated, University of British Columbia library building, Vancouver, B. C.; general contract awarded to E. J. Ryan & Co.

Ford To Experiment with Direct Process

Arrangements have been made whereby the Ford Motor Co. immediately will erect at River Rouge, Mich., a demonstration plant for producing steel from iron ore by the Bourcoud direct process. It is the intention of the Ford Motor Co. to base its steel supply largely on this process if it is successfully demonstrated and it is planned to build a large plant for direct steel production if results are in accordance with expectations. In the meantime, plans of the Ford company for the erection of an open hearth steel plant at River Rouge will be held in abeyance.

The Bourcoud process was invented

by A. E. Bourcoud after investigations over a period of many years and was described in IRON TRADE REVIEW, Aug. 11, 1921, and in a paper presented by Mr. Bourcoud at the November, 1921, meeting of the American Iron and Steel institute.

Briefly, the Bourcoud process is comprised of four stages. The first is the gasification of powdered coal or oil. The second is the reduction of the iron ore by means of the gases thus produced. The third is the delivery of the resulting iron sponge at a high temperature into electric furnaces where the slag is removed. The liquid metal, if necessary, then is refined in the usual way in an electric furnace. The process would eliminate entirely the blast furnace and open-hearth furnace in the production of steel. It is expected that all of the power required in the operation of the Bourcoud process will be provided by the waste heat generated in the process and this is expected to be one of its chief economies. It is claimed for the process that it will entail less consumption of fuel and that any grade of coal or oil can be successfully utilized. If the process works out as anticipated, the Ford Motor Co. expects to have a low steel producing cost.

Valley Operations Less In Holiday Week

Youngstown, O., Dec. 24.—Finishing mill schedules in the Mahoning valley are curbed this week for repairs as is customary during the last week in the year although activity in other steelworks' departments is being well maintained. Sheetmakers with hot mills undergoing repairs this week include the Newton Steel Co., the Falcon Steel Co., the Sharon Steel Hoop Co. and the Youngstown Sheet & Tube Co. at its East Youngstown division. All finishing mill departments at these plants, however, are engaged. All other hot mill departments in this territory maintained a working schedule until Monday night but plan to close down for the holiday, resuming operations Wednesday. In this connection the Trumbull Steel Co. will operate 13 units, the Mahoning Valley Steel Co. and the Republic Iron & Steel Co. eight each and the Youngstown Sheet & Tube Co. five units at its Western Reserve division. This will place the sheetmaking industry here on a 29 per cent operating basis.

Charging of independent open hearths will be discontinued Monday night but resumed Wednesday on 11 units at the Youngstown Sheet & Tube Co., nine at the Republic Iron & Steel Co., seven at the Trumbull Steel Co. and six at the Sharon Steel Hoop Co. placing independent steel making in this district on an operating basis of 65 per cent, the same as for the past four weeks.

Other operations include four butt-weld pipe mills at the Youngstown Sheet & Tube Co., five pipe and a plate mill at the Republic Iron & Steel Co. and 31 hot tin mills and strip mill operation at 60 per cent at the Trumbull Steel Co. During the week just closed Mattie stack of the A. M. Byers Co. at Girard, O., and D stack at the East Youngstown, O. group of the Youngstown Sheet & Tube Co. were placed in blast.

Roads Press for Deliveries

Chicago Rail Mills Working Almost at Capacity—Equipment Buying Interest Centers in Southern Pacific's 10,000 Car Award Expected Soon

RAILROAD TRACK MATERIAL PRICES, PAGE 1697

Chicago, Dec. 24.—Makers of steel rails continue to be beseiged by the railroads for deliveries on contracts now on books. This has resulted in rail mills in this district being speeded up virtually to capacity. The leading rail maker has booked between 5000 and 6000 tons of rails in the past week in small lots. Light rails still are inactive and the quotation of 2.25c, mill, is weak.

It is understood here that the New York Central railroad award of 20,000 tons of tie plates has gone to the Bethlehem Steel Co., Illinois Steel Co., Sellers Mfg. Co., and the Dillworth-Porter Co., with the greatest tonnage going to the Bethlehem company. A Cleveland maker of bolts and nuts is said to have been awarded 25,000 kegs of bolts by the New York Central. Although local mills took 16,500 kegs of spikes—12,000 by Illinois and 4500 by Inland—the New York Central is said to have placed most of its recent spike award in the Pittsburgh district. Some small miscellaneous inquiry for track fastenings has been received in the past week.

Interest in the freight car situation still centers on the Southern Pacific's 10,000 cars, of which 6500 are expected to be awarded any day and 3000 by the end of this week. The Minneapolis Steel & Machinery Co. has taken 500 underframes for the Great Northern railroad.

New York Central Inquires

New York, Dec. 24.—The New York Central railroad has issued an inquiry for its first quarter steel requirements, bids to be opened Dec. 28. Included are 5000 tons of bars, considerable tonnage of plates and shapes, 500 tons of nails, substantial quantities of sheets, billets, axles and other products.

The New York Central railroad has placed its orders for track accessories for delivery over the first quarter. The road bought far in excess of the large tonnages involved in its original inquiry.

About 130,000 tons of rails for foreign countries, it is estimated, now is pending. Argentine, Chile, Brazil and Japan are among those inquiring. The Western Australia railroad wants 15 locomotives and the Southern Australia wants 1250 cars. Both of these orders are expected to come to this country. India also is inquiring for some cars and locomotives.

The International & Great Northern railway has bought 12,000 tons of rails and 3000 tons of track accessories.

Open Market Buying Light

Pittsburgh, Dec. 24.—Open market buying of light rails is spasmodic and at best involves but small tonnages. Single carloads rule with an occasional 100-ton lot, except when a large interest buys for delivery to two or three different points, possibly 100 tons in each case. The majority of orders is coming from coal mine operators, some of whom are placing their business with rerollers at a price all the way down to $10 per ton below the billet-rolled rail figure of 2.25c base Pittsburgh, or 1.75c. The usual quotation on rerolled is 2.00c, base Pittsburgh, but has been quoted by one or two plants which stand in particular need of business.

Obligations in standard track spikes are heavy, some of the local makers being filled up for all of the first quarter and a large portion of the second. Recent bookings have given them these satisfactory backlogs and the 3.00c price at which the greater part of the orders were taken, is fast being superseded by a 3.15c level. On current inquiries involving 1000 or 2000 kegs at a time, the 3.15c price is firm and that soon may be the market's minimum. Small-lot sales of small spikes occasionally are made and on these makers are quoting 3.50c, base Pittsburgh. This size is inactive because of the lack of expansion in coal mines. Tie plate sales recently have been fairly heavy, one or two large inquiries still being before the trade. The 2.55c price holds. Track bolt orders likewise have been large, several railroads having placed standard track bolt requirements at 4.00c, base Pittsburgh.

CAR ORDERS PLACED

Great Northern railroad, 500 steel underframes, to Minneapolis Steel & Machinery Co.

Rapid Transit Subway Co., New York, 100 motor cars, to American Car & Foundry Co.

CAR ORDERS PENDING

Missouri Pacific railroad, three gasoline motor cars; pending.

Swift & Co., 200 to 500 underframes; pending.

Algoma Steel Corp. Mills To Resume Jan. 14

Toronto, Dec. 24.—It is officially reported that the rail mill of the Algoma Steel Corp., Sault Ste. Marie, Ont., will start operating on double shift Jan. 14. The merchant mill will start up at the same time. The corporation proposes to blow in two furnaces in addition to the one now producing. Additional coke ovens will be operated as well as both open-hearth furnaces. It is expected that the first rolling of rails will be for the eastern lines of the Canadian National Railways.

J. E. McLurg has been appointed vice president of the British Empire Steel Corp., Montreal. This appointment fills the vacancy created by the retirement of D. H. McDougall some months ago. Mr. McLurg is general manager of the Halifax Shipyards, and prior to the war was associated with the Algoma Steel Corp. as superintendent of transportation and manager of sales.

It is reported that the Granby Consolidated Mining, Smelting & Power Co. proposes to produce pig iron from smelter slag at its plant at Anyox, B. C. The company is experimenting with slag that has previously been regarded as a waste product. The Anyox smelter now produces about 400 tons of slag per day. The slag contains about 52 per cent metallic iron.

The Nonferrous Metals

Trading Quiet But Prices Generally Change Little Except in Tin—Zinc Easy and Then Firm

	Copper—Electro delivered	Copper—Lake delivered	Spot Straits New York	Lead† New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Dec. 19	13.12½	13.25	46.75	8.00	6.20	26.50	9.25	29.00
Dec. 20	13.12½	13.25	46.50	8.00	6.25	26.50	9.25	29.00
Dec. 21	13.12½	13.25	47.12½	8.00	6.25	26.50	9.50	29.00
Dec. 24	13.12½	13.25	47.12½	8.00	6.25	26.50	9.50	29.00

†Outside market quotation.

NEW YORK, Dec. 24.—Holiday dullness has prevailed in the metal markets this week. The New York metal exchange closed from last Friday to Wednesday this week while the London metal exchange is closed from Friday to Thursday.

Prices generally have been steady to strong, with few marked changes. Rumors of possible dissolution of the Copper Export association, organized in January, 1921, under the Webb act, to market copper abroad, were numerous this week. A meeting of the association was held last Wednesday and while the association has not dissolved, its continuance is considered uncertain. Copper prices have held steady at 13.12½c, delivered, for early deliveries and 13.25c for late first quarter. Lake copper also has been quoted 13.25c; casting, 12.75c, refinery. The market has been quiet, both here and abroad.

The tin market has ranged between 46.25c and 47.75c for Straits tin the past week, with considerable professional trading but little consuming buying. While it is expected December will show some increase in the world visible, the American visible stocks are expected to be less than 1000 tons Dec. 31. Consequently there has been a tendency to ask a premium for January deliveries.

Antimony prices have risen ½ cent to 9.50c, duty paid, for spot, and 7.25c c.i.f. in bond for futures.

The demand for aluminum has been less insistent but some tonnage has sold in the outside market at 26.50c, delivered, for first half delivery, 98 to 99 per cent virgin ingot. Small lots of 99 per cent have sold at 28.00c. The domestic producer continues to quote these grades 26.00c and 27.00c, respectively. Scrap also remains strong, with old castings quoted 18.25c to 18.50c, Detroit.

Zinc reacted to 6.15c, East St. Louis, for prompt shipment, then recovered to 6.25c, with improved buying by galvanizers for early first quarter. The strength of the Joplin ore market at $41 is preventing much price reduction in slab zinc. An insignificant amount of zinc export business was done the past week, the London market being generally too low to be attractive.

Lead has continued in a strained position in respect to supplies of December and January shipment lead and the market for these positions has been extremely strong. Sales were made at 7.75c East St. Louis and of spot lead in carlots at 8.17½c, New York.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 4 oz., min.	21.00
High brass	17.75
Zinc, ga. 9 to 18 (plates ½c less)	9.25
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up	36.40
SEAMLESS TUBES	
High brass	22.00
Copper	23.50
RODS	
High brass, round, ⅜ to 2½-inch	15.50
Naval brass rods	18.25
WIRE	
Copper	15.87½
High brass	18.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.25 to 9.50
New York	8.50 to 9.00
Chicago	9.00 to 9.25
HEAVY YELLOW BRASS	
New York	5.50 to 6.00
Chicago	7.00
Cleveland	6.75 to 7.25
ZINC	
New York	4.25 to 4.50
Cleveland	3.75
Chicago, dross	4.25
HEAVY COPPER AND WIRE	
Cleveland	10.50 to 11.00
New York	10.50
Chicago	10.75
RED BRASS TURNINGS	
New York	7.50 to 8.00
Cleveland	8.50 to 8.75
Chicago	8.50 to 9.00
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.25
New York	6.00 to 6.50
Chicago	6.50 to 7.00
ALUMINUM BORINGS	
Cleveland	10.00

Ends Buffalo Hearing

Buffalo, Dec. 24.—After being in session almost continuously from Nov. 22 until Dec. 19, the federal trade commission holding hearing on the consolidation of the Bethlehem Steel Corp. with other steel producers adjourned for the Christmas vacation. Hearings will be resumed, it is expected, after the first of the year, in Washington.

The two last witnesses were William S. Breeden, former general sales manager for the Lackawanna Steel Co. and W. C. Pratt, chief engineer for the McManus Steel Construction Co.

The elimination of its short-term notes through conversion and the payment of these notes at maturity has removed the final pressing obligation of the Penn Seaboard Steel Co., and officials of the company say that it now is in a position to work out plans for expansion. Working capital is $1,045,153. Current assets of $2,380,045 compare with current liabilities of $1,334,892.

Buying Rates

Of Refractories Improved—Chrome Brick Particularly Active

Pittsburgh, Dec. 24.—With buying rates slightly improved during the past week, various makers of refractories expect that December will prove to be a better month than was November, unless a slump occurs during the holidays. At this time of the year specifications usually fall off and new buying is slim, buying action being deferred until early in the new year. The brick has been ordered for the new open-hearth furnace for the Republic Iron & Steel Co. at Lansingville, O. Small orders prevail, 50,000 or 100,000 brick at a time being usual with an occasional 250,000 or larger lot, makers being indifferent to contracts for the first quarter or first half as yet in both fire clay and silica.

While no formal advance has taken place prices are somewhat firmer than they were since quotations below $40 on silica have practically disappeared. More orders are being taken by the producers maintaining a minimum of $42 than was the case two or three weeks ago. The $42 figure likewise fast is becoming minimum in fire clay and a fairly large number of orders for certain brands are placed at as high as $45.

Chrome brick has been particularly active since a large number of consumers have contracted for their first quarter, first half and even entire year's requirements. These contracts involve all the way from 50,000 to 300,000 brick at a time and in several instances chrome brick has been specified to take the place of magnesite. While the going market is $47 to $48 on chrome brick, some consumers who have placed their entire year's requirements with one producer have naturally been able to develop a slightly lower figure. A few magnesite brick orders involving one to three carloads at a time likewise have been booked and latterly concessions of $2 have appeared in connection with attractive orders.

Refractories

FIRE CLAY BRICK (Per 1000 f.o.b. works)	
Pennsylvania, No. 1	$42.00 to 45.00
Pennsylvania, No. 2	35.00 to 38.00
Ohio, No. 1	42.00 to 45.00
Ohio, No. 2	35.00 to 38.00
Illinois, No. 1	45.00 to 48.00
Illinois, No. 2	42.00 to 44.00
Kentucky, No. 1	42.00 to 44.00
Kentucky, No. 2	37.00 to 39.00
Missouri, No. 1	38.00 to 40.00
Missouri, high grade	48.00 to 50.00
Maryland, No. 1	44.00 to 51.00
Maryland, No. 2	40.00 to 42.00
SILICA BRICK	
Pennsylvania	40.00 to 42.00
Chicago	49.00
Birmingham	50.00
MAGNESITE BRICK (Per Net Ton Seaboard Base)	
9 x 4½ x 2½	$63.00 to 65.00
CHROME BRICK (Per Net Ton)	
9 x 4½ x 2½	$47.00 to 48.00

Coast Demand Holds Well

Seasonal Dullness Less Than Last Year—Annual Overhauling of Manufacturing Plants Expected To Give Rush Orders to Shops

SEATTLE, Dec. 19.—While some seasonal dullness is apparent in iron and steel, conditions are better than December, 1922. Wholesale jobbers find demand well sustained. During the next 30 days logging and lumber plants will undergo the annual overhaul which means that foundries and machine shops will have considerable rush work, while dealers expect to sell new equipment. Building holds up surprisingly well and everything required in construction is showing a good turnover.

Naturally, buying is limited to post-inventory delivery but the consuming trade has already placed liberal orders for arrival during the first quarter.

The following announcement by the Puget Sound intercoastal conference is of interest to the steel trade on this coast:

"Rumors have been circulated recently that some of the intercoastal conference lines have been quoting less than the tariff rate on steel or have indicated that they might take less than the tariff rate. These rumors have been more or less disturbing to the trade and in order to clearly state their position a meeting was held of all conference lines at New York, following which C. A. Torrance telegraphed the conference members on the Pacific coast that all lines unanimously reaffirmed that they will not quote or offer steel at less than conference rates and they all expressed the opinion that they felt confident steel rates were stabilizing for the balance of the year and early part of 1924."

Steel ship repair yards are busy. Todd Dry Docks, Inc., was awarded the contract for repairing and reconditioning the fast passenger steamer NANKING. The steamer H. F. Alexander is at this yard having her boilers entirely retubed, some 11,000 tubes to be renewed. The MOONLITE is being equipped with diesel engines for the same owners.

Conditions at machine shops and foundries show little change during the last three months. Foundry business has eased off although considerable seasonal work is being done. New orders are not showing much volume although an improvement is expected next month. As a rule machine shops have more work than foundries, some plants being busy on equipment for logging and lumbering, several large export orders featuring. Labor conditions are satisfactory in the metal trades, there being an ample supply of mechanics.

Pig Iron and Coke

The pig iron market has holiday lethargy. The turnover is limited as there is little buying. As a rule dealers have covered their requirements for first quarter delivery and a hand-to-mouth business is being done in spot stocks. Prices are unchanged, the best grades of British and Scotch iron, early 1924 delivery, being quoted at about $34. Spot iron commands from $1 to $1.50 premium here. Practically all the coke used here and in Portland is domestic brands mixed with imports from Fernie, B. C.

Bars, Plates and Shapes

The recent reduction in the price of bars seems to have stabilized the market and no further reports of cutting are in circulation. Coast prices are now uniform. It has not resulted in increased sales. Plates are in fair demand for repair work and fabricating. Considerable activity prevails at a majority of fabricating plants and several good sized contracts are in view. Some inquiry for steel bars has recently been received from Japan but no important orders have been placed. While Japanese interests are apparently feeling out the market on steel, as well as on other commodities, buying in that country seems to have disappeared for the present. The same condition applies to lumber.

Other Finished Materials

While wholesale houses anticipated the usual holiday lull, they find buying has been well sustained. Expectations are that stocks will be reasonably low by inventory time. Business with manufacturing plants, which will close during the holidays, is expected to be brisk for repairs and replacements. Sheets are in fair demand, galvanized still being 25 cents per 100 pounds under black and blue annealed in the Seattle district. Some inquiry for wire and nails has come from Japan but no business is reported.

Steel Shipments by Barge Increase in Size

Pittsburgh, Dec. 24.—The seventeenth and largest movement of manufactured steel in barges down the Ohio and Mississippi rivers from the works of the Jones & Laughlin Steel Corp., left Pittsburgh Dec. 13 in tow of the steamboat WARREN ELSEY, in command of Capt. P. C. Elsey, assistant master of river transportation. The tow of 13 barges was assembled at the Aliquippa works at Woodlawn. It is transporting many thousands of tons of steel pipe, wire products and structural material to customers in the West, South and Southwest. Two additional barges will go out later with another boat.

As there is a full stage of water the entire length of the Ohio and all the dams are lowered, thus avoiding the delays incidental to passing through the locks, it is anticipated that the barges will make exceptionally good time through to Cairo, Ill., the junction point of the Ohio with the Mississippi river, a distance of nearly 1000 miles by river from Pittsburgh. Rivermen estimate that the tow should reach the Mississippi in about six days, which is fast time for heavy freight. This is said to be less than the time by rail to the same destination. Enroute stops will be made at Louisville, to set out a barge, and at Evansville, Ind. to drop two barges. At Cairo the remaining 10 barges will be turned over to the Mississippi-Warrior service, better known as the Federal Barge Line, a government owned and operated service working on regular 6-day schedule between St. Louis and New Orleans. The Federal line towboats will take the remaining 10 barges to St. Louis and Memphis, eight going to the former port and two to the latter. At St. Louis and Memphis the cargoes will be transferred over the municipal river and rail terminals from barges to railroad cars for final delivery.

All the barges in this movement are new steel craft designed especially for service of this character and built by the Jones & Laughlin corporation. They are of two types and two sizes, "gondola," or open top barges, 35x132 feet and 26x100 feet, and "box," or closed barges, 35x132 feet, the latter being required for transportation of products needing protection from the weather, such as wire nails, fencing material, tin plate and wire products in general.

At Cairo the towboat WARREN ELSEY will pick up a fleet of empty barges from the previous trip and return to Pittsburgh, being scheduled to arrive here about the end of the month. The next similar movement from the Jones & Laughlin mills is scheduled to go out early in January and it was stated by W. T. Mossman, who has general direction of this service, that it is the intention to operate throughout the winter, providing unusually severe weather conditions do not force suspension. Tows will be scheduled to depart regularly every month from now until June or July, when low stage of the water in the Ohio makes it impossible to get loaded barges through to Cairo. However, as it was found practicable during the past summer to operate with comparative regularity between Pittsburgh and Louisville, and distribute by rail out of the latter port, it is probable this will be done next summer.

Bright Outlook

For Better Business Says Campbell—Operations to Increase

Youngstown, O. Dec. 24.—"We believe that decidedly better operating conditions may be expected during the first half of 1924," says James A. Campbell, president of the Youngstown Sheet & Tube Co., in a message to employes analyzing the business outlook, with particular reference to the iron and steel industry. He states:

"Demand for iron and steel products gradually lessened during the last half of 1923. Some lines were affected more than others, the most pronounced decline being felt in the demand for large pipe, which is our most important product. There were several reasons for this condition. In the case of oil country pipe it was due to over production of oil during the early part of the year, resulting in lower prices and a general cessation of drilling operations, especially in the mid-continent field. Because of this, and because of our large capacity for making oil country pipe, our operations were affected more than those of other companies not so largely engaged in the production of this class of material.

"Some of the steel companies considerably oversold their capacity during the first half of the year and have been furnishing this tonnage during the last half while other companies have been shading prices to secure business. This has brought about very conservative buying among users and distributors of steel products, who naturally believed that lower selling prices might prevail by the end of the year.

"As a rule, this company has been able to operate at about the same percentage of its capacity as other competing companies, but I think that, due to the conditions mentioned, we have operated our mills during the past few months at a slightly lower rate than some of those companies.

"We might have secured more business during this period by reducing our selling prices, but could not afford, under the increased costs that have come about during the past year, to do this. We now believe that after the beginning of the new year, there will be sufficient business offered to increase our operations.

"There are several reasons for believing that business will be better during the first half of next year. Our best information is that stocks in the hands of consumers and distributors are small, owing to the conservative buying policy of the past several months.

"The railroads, which are large buyers of steel products, have had a very prosperous year. They have bought large quantities of rails, spikes and tie plates for 1924 delivery, and contemplate the purchase of about 100,000 cars and many locomotives. There is good reason to believe that a large part, at least, of this program will be carried out, as this equipment will be needed and its purchase can be financed by the roads.

"Building operations bid fair to be much larger in most sections of the country next year than they have been this year, and this has been an important factor during 1923.

"All of the leading automobile manufacturers, who are large consumers of steel products, have, we understand, planned to operate at full capacity, in view of continued demand for their output.

"The farmers, except those in the wheat belt west of the Mississippi, have been more prosperous this year than has been generally supposed, and they will be able to buy farm implements, automobiles and trucks in greater volume than was anticipated some months ago.

"Money is plentiful and is to be had at reasonable rates to finance business activities, as well as for use of the farmers, and anyone who is entitled to it will be able to secure long or short term credit.

"Last, but not least, with two notable exceptions, values are more nearly in line with one another than they have been since 1914. One of these exceptions is fuel, which is above the general level, and the other farm products, except cotton, which are below the general level. Sooner or later, the value of these commodities which are out of line must be brought into harmony with that of other products, and if the government keeps its hands off, the law of supply and demand will soon bring this about. When all commodities finally reach the proper relative values, conditions will be more nearly normal business will naturally improve."

Electric Companies Merge

New York, Dec. 24.—Mitaubli Denki Kabuahiki Kaisha, or Mitsubishi Electric Mfg. Co. has been organized as a result of a recent arrangement between the Westinghouse Electric & Mfg. Co. and Japanese electrical interests, according to cables to Westinghouse Electric International Co. from Guy E. Tripp, chairman of the Westinghouse company's board, and L. A. Osborne, president, who are now in Japan.

The Westinghouse company owns a portion of the stock of the Japanese company. The Takataoe Co., Japanese importers at 30 Church street, is also interested, and is the Japanese agent of the Westinghouse company.

Rebuilding Ore Docks

Preliminary work has been started by the Chicago & Northwestern Railroad Co. on the reconstruction of its No. 2 ore dock and the overhauling of Nos. 1 and 3 docks at Ashland, Wis. The contract for the entire work has been placed with Peppard & Fulton, Superior, Wis., and St. Paul, Minn. This involves about $250,000. While No. 2 dock will be rebuilt as a timber structure, electrical operating equipment will be installed.

Early Action Urged on Census Returns

Washington, Dec. 24.—The bureau of the census is now engaged in collecting statistics of manufactures covering the calendar year 1923. These statistics are compiled in accordance with the act of congress of March 3, 1919, and the schedules have been prepared after conference with the associations and others interested in the various industries. The schedules will be mailed to manufacturers on Jan. 2 and the director of the census is anxious to publish the statistics at the earliest possible date that they may be of the greatest possible commercial value.

Manufacturers in the iron and steel and related industries are requested to forward their reports to the bureau before the end of January. The bureau has agreed to tabulate the results as rapidly as the schedules are received and publish the totals within a few day after the receipt of the last report.

If the reports are not made by mail it will be necessary for the government to go to the expense of sending a special agent to the various establishments.

Northern Lake Port Coal Receipts Set Record

Superior, Wis., Dec. 24.—With a total of 12,688,321 tons of coal unloaded at Superior and Duluth docks, the 1923 season broke all existing records for tonnage of receipts. The increase in shipments of hard coal during the season just ended over that of last year was 853,522 tons and the soft coal increase was 6,129,403, the report shows.

The average receipt of coal at the Superior-Duluth harbor in the six years previous to this season is 9,371,572. This year's shipments were 3,316,749 tons more than that number. This is an increase of 35 per cent over the average seasonal receipts.

The navigation season so far as coal receipts were concerned lasted from May 5 to Dec. 10, during which period 1441 coal cargoes entered the local harbor.

J. J. Dale and C. M. Robertson, who have been affiliated with the Consolidated Machine Tool Corp., Chicago, on Jan. 1 will revive the Dale Machinery Co., which sold its stock of tools to the Consolidated corporation in 1921. The Dale company will have quarters at 549 West Washington boulevard, Chicago.

British Tariff

Program Not Likely To Be Revived for Many Years

European Staff Special

London, Dec. 13.—Well informed circles in Great Britain do not believe that any British government will raise the issue of protection again for another 10 or 20 years in view of the results of the election on Dec. 6, when a majority of over 3,000,000 voters out of 13,000,000 declared themselves opposed to anything in the nature of a tariff.

It is not believed that the Baldwin government, if it continues in office, will dare even to extend the present safeguarding of industries acts in any way. It is not likely that any of the existing duties now being levied on chemicals, optical glass, automobiles, and accessories, will be lowered or abolished, but it now seems as certain as anything political can be that there will be no extension of British traiffs.

All possibility of interference with American export trade with England in machine tools, foundry equipment, shop supplies, typewriters, malleable pipe fittings, valves, electrical machinery, sheets, and other forms of iron, steel machinery, to a total value of some $50,000,000 per year, has been removed.

British iron and steel producers generally are deeply disappointed with the result. They had looked forward to a regime of protection which would enable them to increase their production to full capacity. Most of the mills at the present time are operating about three quarters of capacity and the unemployment in the iron and steel industry alone exceeds 60,000 men. Together with the shipbuilding and engineering trades the unemployment exceeds 350,000. Nevertheless nine out of ten British workmen are employed and the election shows that the nine who have jobs are more concerned with cheap imports and low prices than with the problem of unemployment for the minority.

The tariff commision which the Baldwin government set up under the presidency of Viscount Milner probably will be abolished. At anv rate, under the present political situation its report will have only academic interest. It cannot be too strongly emphasized that the question of protection is dead in Great Britain for considerable time to come, although eventually leading business observers believe that the Labor party will be obliged to change front and take steps toward protection in view of the fact that the cost of production in Great Britain is higher than in many continental European countries at present.

Committee Operates Plant

New Philadelphia, O., Dec. 24.—After-war deflation and consequent failure of sales campaigns is assigned as the cause of the decision of the stockholders of the Wise-McClung Mfg. Co., of this city, electric sweeper manufacturer, to have the palnt operated by a committee of three named by the company's creditors.

The committee will be composed of L. G. Pierce, secretary-treasurer of the Airway Electric Appliance Corp., Toledo, A. C. Pahnke, secretary of the U. S. Reduction Co., Chicago and C. A. Duffner of the Domestic Electric Co., Cleveland.

Four preferred stockholders also were given positions on the board of directors, and G. M. Earle, this city and F. N. W. Zenhauser, Chalres B. Spence S. Spring. About 100 are employed at the plant at present.

Adding to Sheet Plant

Camridge, O., Dec. 24.—Announcement is made of the enlargement of the Guernsey works of the American Sheet & Tinplate Co. The improvement started in the spring will involve an expenditure of $350,000 it is stated by officials.

Among the improvements planned are at least three additional buidings the main one to replace the present galvanizing department. An extension will also be made to the annealing furnace and improved pickling equipment installed.

The plant employs 825 men and the enlargement will mean additional forces. Production this year by the plant exceeded by 53,000 gross tonnage the best previous year.

Leases Cotton Mills

The rolling mills, formerly owned by the Cleveland Brass & Copper Mills, Inc., have been leased by Dr. C. T. Hennig. Dr. Hennig is at the head of a syndicate interested in the manufacture of sheets, rods, wire and tubes in nickel, nickel alloys, brass and other ferroalloys. He was formerly identified with the American Nickel Corp., Clearfield, Pa. The plant will be converted for that purpose, arrangements being made to start production as soon as possible.

Creditors have filed a petition in the federal court at Utica, N. Y., asking that the McGill Machine Co., of Binghamton be declared bankrupt. Liabilities were reported at more than $10,000.

New Business in Fire Clay Brick Falls Off

Pittsburgh, Dec. 25.—Net new business in fire clay brick for November as reported to the Refractories Manufacturers' association, fell off 4 per cent, to 57 per cent, as compared with October, while in silica net new business remained on the same basis as in October, namely 31 per cent. Production and shipments of both fire clay and silica likewise declined, production of fire clay going from 77 per cent in October to 69 per cent in November; shipments from 71 to 62 per cent. Production of silica declined from 44 per cent in October to 35 per cent in November, shipments declining 10 per cent, going from 41 to 31 per cent. Unfilled orders on Nov. 30 in fire clay represented 76 per cent of capacity, whereas on Oct. 31 they represented 81 per cent. On the other hand, unfilled orders in silica brick on the last day of November were approximately the same as on Oct. 31, or on the basis of 106 per cent of capacity reporting. The comparative figures in 9-inch equivalent of both fire clay and silica brick for November and October, follow:

FIRE CLAY BRICK

	Nov. 30, 1923	Oct. 31, 1923
Capacity reporting	74,839,727	74,212,811
On hand last day preceding month	170,139,089	164,324,610
Production	51,860,352	57,774,841
Shipments	46,535,313	53,316,214
On hand last day current month	175,464,128	168,782,237
New orders received during month	44,334,971	45,870,737
Cancellations	1,816,039	602,722
Net new business	42,518,932	45,268,015
Unfilled orders last day current month	57,449,846	60,735,806

	Nov. 30, 1923	Oct. 31, 1923
Capacity reporting	22,565,500	22,565,500
On hand last day preceding month	35,210,516	34,473,914
Production	7,987,023	10,024,736
Shipments	7,036,155	9,288,134
On hand last day current month	36,161,384	35,210,516
New orders received during month	7,818,602	7,133,579
Cancellations	878,089	55,936
Net new business	6,940,513	7,077,643
Unfilled orders last day current month	23,879,332	23,974,974

In explanation of the apparently large difference between the stocks on hand as of Nov. 30 and the unfilled orders on the same date, it is stated that included in the stocks are large quantities of shapes made up in advance of the receipt of actual orders. The actual "free" stock of 9-inch straights on Nov. 30 in fire clay was 54,264,718, or 68 per cent of the monthly producing capacity of those reporting, while in silica, 7,923,779 brick were available to apply on new orders, or 87 per cent of the monthly producing capacity of those reporting.

The Hayes Brass Foundry, Inc., has been removed from 132 Richmond avenue to 1624 North Salina street, Syracuse, N. Y.

British Roads Buying Equipment

London & Northeastern Announces Expenditure of £5,000,000—More Ship Contracts Let—60,000 Tons of Plates Booked—Sheetmakers Form Export Combination—Ruhr Operations Better

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Dec. 24.—Additional heavy railroad buying is the feature of the week in the British market. The London & Northeastern railroad announces an equipment expenditure of £5,000,000, orders including 12,000 cars, 700 passenger coaches and 273 locomotives. Another feature of interest in the market is the fact that Vickers, Ltd., have taken a contract for three ships. Nine have been contracted for at Middlesbrough.

A northeastern steelmaker has booked 50,000 tons of plates, and a Welsh mill has taken 10,000 tons more, at £10 ($44.20) mill. A lull has followed the railroad buying and price changes generally this week are unimportant. British sheetmakers have organized an export combination under the name of the Oriental Co., with headquarters at London. The organizers hope to control the eastern trade price.

More German offerings are noted this week. A dozen stacks in the Ruhr are operating, and others are to resume soon. German workmen are gradually accepting the proposal for a longer day.

Ruhr Resumes Work on Agreement With France

European Staff Special

Office of IRON TRADE REVIEW,
23 Rue de la Bienfaisance

PARIS, Dec. 7.—Negotiations between the Franco-Belgian authorities and delegates of the Ruhr consortiums finally have been concluded by an agreement. Contracts similar to those signed a few weeks ago with the Wolf and Krupp groups have recently been executed by delegates representing the Stinnes, Thyssen and Kloeckner groups. Work has been resumed throughout the Ruhr district and the arrangement may lead to a solution of the reparations problem. The official text of the agreement has not been published but reports received from news agencies at Dusseldorf give the most important clauses of the arrangement as follows:

The mines represented by the German delegates agree to pay the allies $15,000,000, representing taxes due June 1 to Nov. 1; they will pay the allies 10 francs ($0.55) for each ton sold; they will deliver to the allies, free of cost, 18 per cent of their production; stocks on hand in the Ruhr as of Oct. 1 will remain the property of the allied authorities; the regulation concerning export licenses is to remain in force, stocks of metallurgical products now on hand cannot be removed until past due taxes have been paid and cannot be exported in quantities exceeding the average amounted exported during 1922; deliveries of by-products (ammonia, sulphate, benzol, tar creosote) will be the subject of a special agreement.

Receipts from taxes on exports will be credited to a special account tand used to defray the expense of occupation, which will be given priority. The surplus will be credited to the reparations account. Careful record will be kept of all merchandise delivered to the allies by the Germans and their value will be credited to the reparations account.

It is difficult to forecast what effect this arrangement will have upon the French iron and steel market. In view of the fact that the Ruhr industries have been paralyzed for nearly a year it will probably be some time before the mines and mills are operating normally. The French market will, therefore, have time to adjust itself to meet any change.

Franc—$0.055

Iron and steel prices remain practically unchanged. The market is firm as export sales have improved and the confidence of home consumers has been inspired by the fact that the railroads have released several large orders. The Chemin de Fer de l'Est has ordered 16,000 tons of rails and 600 tons of splice bars. The rails were sold at 556 francs ($31.50) per metric ton and the splices at 635 francs ($34.90). The rail order was divided among several mills, 4000 tons going to Micheville and 2000 tons to each of the following: Senelle-Maubeuge, de Wendel, Acieries de Longwy, La Chiers, Chatillon-Commentry and la Providence.

Prices show little change but this department will probably be the first to feel the effects of the Ruhr agreement and lower prices are anticipated as soon as Ruhr coke becomes available in larger quantities. Chill-cast No. 3 foundry is now quoted at 400 francs ($22) per metric ton.

The semifinished department is quiet and prices remain unchanged. Finished steel products are firm and mills are booked ahead from six to eight weeks.

Iron and steel production in France during October reached the figures registered before the occupation of the Ruhr in January. Nov. 1, the same number of furnaces were active as Jan. 1, 116, compared with 111 Oct. 1, 106 on July 1, 77 April 1.

Pig iron production in October was 514,230 tons, or 32,356 tons more than September. Basic bessemer pig production was 346,467 tons; foundry pig 118,892 tons; refining pig 28,646 tons; acid bessemer pig 1458 tons; special grades 18,767 tons. Lorraine's contribution to the total tonnage was 181,840 tons compared to 173,018 tons during September.

The October output of steel ingots and castings was 476,696 tons, 30,216 tons more than during the preceding month. Ingots were 465,194 tons and steel castings 11,502 tons. In Lorraine, the total steel production was 157,537 tons against 149,568 tons in September.

Production for ten months is as follows:

Production in France

1923	Pig iron	Steel ingots and castings
January	486,210	407,731
February	305,526	289,787
March	316,146	315,807
April	350,485	354,791
May	393,428	399,249
June	447,013	427,400
July	436,420	399,528
August	486,250	452,364
September	481,874	446,480
October	514,230	476,696

French Output Largest Since Armistice

Washington, Dec. 24.—Iron and steel production in France in October exceeded the output during any previous month since the armistice, Commercial Attache C. L. Jones cables the commerce department. The pig iron production amounted to 514,230 tons, and steel, 476,696 tons. Each shows an increase of approximately 7 per cent over the figures for September. The figures are also about 25,000 tons above the previous record months of the year and increase the monthly average to 419,900 tons of pig iron and 395,900 tons of steel for the first 10 months of 1923.

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, December 21

British Market

Corrected to Date by Cable
Home Market Prices. Gross Tons at Works or Furnace.

	$	£	s	d
SEMIFINISHED STEEL				
Billets, soft steel	36.47	8	5	0
Sheet bars	36.47	8	5	0
Wire rods	50.83	11	10	0
FINISHED STEEL				
Steel bars, England, ⅝ to 3-inch	46.41	10	10	0
Steel bars, England, ⅝ to 3-inch, for export	43.65	9	17	6
Plates, ship, bridge and tank, England	44.20	10	0	0
Plates, ship, bridge and tank, England, for export	39.78	9	0	0
Plates, ship, bridge and tank, Scotland	44.20	10	0	0
Plates, ship, bridge and tank, Scotland, for export	39.78	9	0	0
Beams, England	41.99	9	10	0
Beams, England, for export	39.78	9	0	0
Beams, Scotland	41.99	9	10	0
Beams, Scotland, for export	39.78	9	0	0
Sheets, black, 24 gage	59.67	13	10	0
Sheets, black, 24 gage, for export	57.46	13	0	0
Sheets, galvanized, 24 gage	83.98	19	0	0
Rails, 60 pounds and over	40.89	9	5	0
Rails, 60 pounds and over, for export	38.68	8	15	0
Tin plate, base box 108 pounds	5.41	1	4	6
Steel hoops	54.15	12	5	0
Steel hoops, for export	49.73	11	5	0
PIG IRON				
Hematite, East Coast, Mixed Numbers	22.65	5	2	6
Hematite, West Coast, Mixed Numbers	23.76	5	7	6
Basic, Middlesbrough	21.00	4	15	0
No. 3 Foundry, Middlesbrough	22.10	5	0	0
No. 3 Foundry, Derby, Leicester, Nottingham	21.00	4	15	0
No. 3 Foundry, Northamptonshire	21.00	4	15	0
No. 3 Foundry, Staffordshire	21.00	4	15	0
No. 3 Foundry, Scotch	23.21	5	5	0
Ferromanganese, 76 to 80 per cent	75.14	17	0	0
COKE				
Yo kshire furnace	5.30	1	4	0
Yorkshire furnace, for export	8.84	2	0	0
Welsh Foundry	7.18	1	12	6
Welsh Foundry, for export	8.84	2	0	0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Pounds per metric ton (2205 lbs.)
PIG IRON		
Hematite	25.64	5 16 0
Foundry, No. 3	25.64	5 16 0
Stahleisen, Siegen	27.63	6 15 0
Foundry, No. 1	25.64	5 16 0
COKE		
Lower Silesian furnace	10.04	2 1 5
Lower Silesian foundry	10.04	2 1 5
SEMIFINISHED STEEL		
Billets	35.58	8 1 0
Sheet bars		Nominal
Wire rods	41.99	9 10 0
FINISHED STEEL		
Standard rails	41.99	9 10 0
Merchant Bars	39.78	9 0 0
Structural shapes	39.78	9 0 0
Ship plates	40.44	9 3 0
Medium plates, 3 to 5 millimeters	39.78	9 0 0
Sheets, 1 to 3 millimeters	39.78	9 0 0
Tin plate, per box of 575 kilograms	8.09	1 16 7
Plain wire	70.17	15 17 6
Bands and strips	52.62	11 18 1

All prices are f.o.b. furnace or mill.
*German prices now are quoted in pounds, sterling.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	23.60	460
Basic bessemer, Lorraine	20.78	405
Foundry, Longwy, No. 3, sand-cast	20.26	395
Foundry, Longwy, No. 3, chill-cast	20.73	405
Ferromanganese, 76 to 80 per cent	79.52	1,550
COKE		
French furnace	6.98	135
German furnace, f.o.b. frontier*	11.29	220
German furnace, f.o.b. frontier**	11.95	233
French foundry	7.95	155
SEMIFINISHED STEEL		
Blooms	24.88	485
Billets	26.68	520
Sheet bars	27.19	530
FINISHED STEEL		
Standard rails	29.24	570
Merchant bars	30.52	595
Angles	29.75	580
Normal beams and profiles	29.75	580
Plates, ship and tank, 10 millimeters and thicker	33.09	645
Plates, bridge and tank, 5 to 10 millimeters	33.60	655
Sheets, black, 3 milliemters	35.65	695
Sheets, blue annealed, 2 millimeters	42.32	825
Shafting, cold-drawn, 40 to 60 millimeters	56.43	1,100
Bars, 2 per cent nickel steel	93.62	1,825

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	19.03	420
Basic open-hearth, Belgian	19.93	440
Gray forge, Belgian	12.23	270
Foundry, No. 3, Belgian	19.48	430
Founndry, No. 3, Luxemburg	19.71	435
Foundry, No. 3, Lorraine	19.93	440
SEMIFINISHED STEEL		
Blooms	25.14	555
Billets	26.27	580
Sheet bars	28.09	620
Wire rods	38.51	850
FINISHED STEEL		
Standard rails	31.71	700
Merchant bars	31.48	695
Normal beams and profiles	28.99	640
Plates, 5 millimeters and thicker	33.75	745
Sheets, black, 3 millimeters	36.01	795
Sheets, galvanized, 1 millimeter	86.07	1,900
Plain wire	54.36	1,200
Galvanized wire	67.95	1,500
Wire nails	56.63	1,250

All prices are f.o.b. furnace or works.

Of the total French output for the month of October, Lorraine contributed 181,841 tons of pig iron and 150,537 tons of raw steel.

During October three blast furnaces were blown in the eastern district and two in the Alsace-Lorraine district, bringing the total number on Nov. 1 to 116, compared with 111 on Oct. 1, 1923. This is the greatest number of blast furnaces in operation for any month of the year.

The October production of iron ore in Austria, according to the latest report from the Alpine Montangesellschaft, the leading unit of the Austrian industry, was 128,421 metric tons; pig iron, 25,271 tons; steel ingots, 32,247 tons; and rolled products, 20,282 tons. These compare respectively with the September production of 114,000 tons; 29,000 tons; 31,000 tons; and 22,000 tons; and with the monthly averages for the first nine months of 1923, of 99,119 tons; 29,493 tons; 26,218 tons; and 19,114 tons. While the German demand for Austrian iron has ceased, other inquiries received brought the unfilled orders up to 36,496 tons, compared with 39,000 tons at the end of September, and the monthly average for this year of 33,811 tons. Prices of bar and hoop iron showed a slight increase, pig and rolled products were reduced, while structural iron remained unchanged.

British Prices Advance On Heavy Buying

European Staff Special

Prince's Chambers, Corporation St.
Office of IRON TRADE REVIEW.

Sterling—$4.38

BIRMINGHAM, Eng., Dec. 7.—The iron and steel trade is so keenly interested in the election that numerous leaders of the industry this week have done little business. But with prices showing an upward tendency consumers could not afford to miss opportunities, and purchases have been heavy, especially of semifinished steel. Merchants have had a busy time handling heavy contracts, mainly for billets.

British values have increased to £8 15s ($38.22) with an isolated firm here and there accepting £8 10s ($37.34),

Belgium, although credited with having heavy bookings into next year has shown eagerness to take business, and leading merchants have placed scores of thousands of tons, largely on the basis of £7 10s ($32.85) per ton, occasionally up to £7 12s 6d ($33.39). It is thought tariff possibilities have stimulated foreign anxiety to book as much as possible.

In the west of Scotland much steel for shipbuilding has been ordered. Middlesbrough is getting an increasing share of shipbuilding trade. An order has been obtained by the Furness Shipbuilding Co. for seven steamers on Canadian account, two for the Canada Steamship line, and five oil-carrying barges for the Imperial Oil Co. of Toronto. In view of the important bearing of the election on shipbuilding. it is understood important tonnages are being held back.

The best buyers are the railways who have placed heavy contracts for rails. Leading mills have competed keenly for this, and it is frankly admitted a good proportion has been taken at a loss. Mills now are secure for fair activity into the new year.

The Scottish steel trade announces today advances in ship plates making ⅜ inch thickness £10 5s ($44.89) with sections £10 ($43.80) per ton and joists £10 ($43.80) with usual extras. The plate association is becoming fairly complete as an organization. In view of competition from abroad and the desire not to check the shipbuilding revival a spirit of caution prevails, and advances are likely to be moderate until the position is much clearer. Steel hoops and steel strip have been advanced. The most marked forward movement is in steel scrap, for which £5 ($21.90) has become a common figure. Merchants are not to accept £4 15s ($20.80), and some consumers who have missed the market and find their scrap stores disappearing have had to pay as much as £5 5s ($22.99). There is no great confidence that these high prices will be maintained, and even sellers consider the upward movement has been too rapid. Little scrap is available, derelict war material having now disappeared, and such engineering material as steel turnings are difficult to get.

Some finished material is still coming from Belgium, plates being on offer at about £1 5s ($5.47) below English prices, and joists are obtainable at an advantage of about £1 ($4.38). The rail mills are running more regularly than for a long time. The Sheffield steel mills are generally busier, being brighter in view of the forthcoming naval extensions, a start being promised in January on 10 of the 17 light cruisers, in the government program.

The Staffordshire iron trade shows signs of revival. The lead has been given by Yorkshire and Lancashire where prices of medium bars have been advanced 10s ($2.19) per ton, making the selling figure £12 10s ($54.75). This is rather above the Staffordshire price, £12 5s ($53.65) being more general though some firms are endeavoring to raise the standard to £12 10s ($54.75).

Progress in pig iron is slow, five additional furnaces being in operation Nov. 30. One reason for slow re-lighting is accumulation of pig iron in stock. No. 3 G. M. B. continues at £5 ($21.90) a figure at the present price of coke considered unprofitable. In addition to the high cost of coke best rubio ore has become dearer at £1 4s 6d to £1 5s ($5.47) a rise of 2s ($0.43) from the minimum figure. Durham furnace coke still costs £1 18s 6d ($8.43) by the time it reaches the Middlesbrough furnaces. In the Midlands, confirmation of prices at £1 4s ($5.25) at the ovens has encouraged some forward buying. No additional furnaces have been lighted in the Barrow or Midland areas.

The galvanized sheet trade is satisfactory, all recent orders being for new year's delivery. Prices are steady at £19 ($83.22) and India has been a good customer. The Glasgow sheet mills are decidedly busier and sheets form an increasing proportion of the shipments from the Clyde.

The tin plate trade is sound, with rather higher prices for next year's bookings, makers claiming as much as £1 4s 6d ($5.26) per box on orders accepted for next year's delivery, and some of these are sufficient to cover the output of mills until well into or through June.

One of the results of resumed work at the shipyards is improved demand for nuts and bolts, on which the Staffordshire mills are becoming busy. Latterly Staffordshire bars for this purpose have been selling at £10 15s ($38.32) delivered. In spite of this competition the Staffordshire price has been advanced to £10 17s 6d ($47.63) the same figure being charged by Lancashire mills.

German Price Fixing Ends; Work Longer

European Special Service

BERLIN, Germany, Dec. 10.—The Stahlbund has been obliged to dissolve, and for the first time in many years the German iron and steel market is free from the influence of prices fixed by groups of producers or merchants. A general fall in prices is expected as a result of inability of the *Stahlbund* to maintain its agreed quotations. The position in the Ruhr is improving and for the first time serious efforts are being made to resume production. Considerable Ruhr steel is being shipped out against old orders. On account of ratification of the railroad agreement the transport situation will probably improve. Efforts are still being made to get the men to agree to a longer work day and this is holding up the resumption of mill operations more than anything else. Some of the coal miners have agreed to an extension of working shifts by an hour. With the labor unions in a weakened condition it is probable that eventually the 10-hour day will be re-established.

There are fairly good inquiries for nails, barbed wire, and black sheets from the Dutch East Indies. China has been ordering good tonnages of narrow plates at the extremely low price of £6 to £6 10s per metric ton f.o.b. equivalent to 1.19c to 1.29c a pound. India is inquiring for 2000 to 3000 tons of bars on which about £8, equivalent to 1.59c, is being quoted. Wire nails produced from Czech rods are being shipped at £16 10s per ton, equivalent to 3.28c, from Danzig to Japan. Ruhr makers are offering nails at £17 (3.39c) f.o.b. including the French export tax. Rails from Ruhr works are now being offered at £8 ($35) a ton. Black sheets have been sold to Scandinavia at £13 to £14, equivalent to 2.58c to 2.69c a pound for base sizes.

On account of the high price of scrap in England the government has been asked to lift the embargo on scrap exports. No action has been taken in this direction because it is believed the Ruhr will need its own.

Belgian Selling Awaits English Election

European Staff Special

BRUSSELS, Dec. 13.—The iron and steel market is dull and prices continue to move slowly downward. English buyers have ceased buying in Belgium and are awaiting results of the election. Several English candidates for office have promised to give their home industries more protection if they come into office and importers are deferring purchases until the air has cleared.

Belgian mills are offering sheet bars for export at £6 12s f.o.b. Antwerp. Pig iron is being quoted at 96s 6d f.o.b. Antwerp. Merchant bars for export are being done around £7 13s and the domestic price averages 700 francs ($35). German competition is again being felt on light gage plates and sheets. Tube mills and manufacturers of wire products now are heavily committed.

Franc—$0.05

The Belgian minister of railways has authorized the purchase of 600 20-ton flat cars. This business will be given to home industries. Additional rolling stock is badly needed but will not be ordered as Germany owes Belgium 12,000 cars on the reparations account.

Nov. 1, 39 furnaces were blowing in Belgium, the same as Sept. 1. Output of pig iron for October was 196,420 tons, 2270 tons more than September.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields of Enterprise

E. H. HASLAM, retained by Hadfields, Ltd., Sheffield, Eng., to assist in the development of that company's interests in America, as announced in IRON TRADE REVIEW Dec. 20, was formerly vice president of Mackintosh-Hemphill Co., Pittsburgh, and recently with the Steel & Tube Co. of America. He is a graduate of the Bradford Technical college in England. One of his first experiences with the metalworking industries was as superintendent of the Pittsburgh plant of the Pressed Steel Car Co.

Incidental to his duties with Hadfields, Mr. Haslam has been made president of the Hadfield-Penfield Steel Co., Bucyrus, O.

* * *

W. C. LeFevre has been appointed general traffic manager of the General Motors Corp., Detroit.

* * *

Presley Hamilton is in charge of the recently opened New York office of the Latrobe Tool Co., Latrobe, Pa.

* * *

J. B. Rodgers has resigned as advertising manager of James H. Matthews & Co., Pittsburgh, metal stamp manufacturer, to assume similar duties with Bernard Gloekler Co., that city.

* * *

Richard Newman has transferred his activities from New Rochelle, N. Y., to 150 Nassau street, New York, where he specializes in railway, mechanical and tank equipment.

* * *

Charles B. Myers, for several years connected with the sales department of the Ames Shovel & Tool Co, Anderson, Ind., has resigned to become associated with the sales department of the Brown Stamping Co., Toledo,

* * *

N. P. Farrar recently has been appointed district manager with offices at 605 Stephen-Girard building, Philadelphia, and 50 Church street, New York, for the Pawling & Harnischfeger Co., Milwaukee, manufacturer of excavators, cranes, machine tools,

* * *

E. F. Merrill, safety inspector, Youngstown Sheet & Tube Co., South Chicago, Ill., resigned from that company some time ago to take charge of safety, fire prevention, police and employment work for the Hubbard Steel Foundries, East Chicago, Indiana.

* * *

A. D. Fields has been added to the St. Louis staff of the H. B. Wilson Co.,

E. H. HASLAM

Minneapolis, manufacturer of rivet forges, furnaces, torches, etc. He will work in the district recently enlarged under the direction of H. B. Wilson and J. M. Shea in charge of that territory.

* * *

J. Ramsey Speer, president of Mackintosh-Hemphill Co., Pittsburgh, has been made a director of the Columbia National bank, that city.

* * *

Joseph Grossman has resigned as president of Grossman Bros. Co., iron and steel scrap dealer, 240 Madison street, Milwaukee. He will engage in the same business at another location after Jan. 1. Temporary offices have been established at 955 Shepard avenue, Milwaukee.

* * *

C. J. Maas was elected president of the Judson Mfg. Co., San Francisco, to succeed the late Henry Bothin. Mr. Maas will continue to act as general manager for the company, a position he held prior to the recent election. Theodore A. Maas was elected treasurer.

* * *

J. H. Ruble, vice president of the H. K. Ferguson Co., Cleveland, engineer and architect, sailed Dec. 9 on the PRESIDENT MCKINLEY for the United States after having spent the last several months in Japan supervising work on the Shibaura Engineering Works at Tsurumi. He narrowly escaped death in the severe Japanese earthquake the first week of September.

* * *

S. H. Fechheimer, recently sponsor of the Industrial Advertising Co., 615 Wayne street, Detroit, was for many years connected with the Truscon Steel Co. For the first five years with that company he was in charge of engineering work, and for the past 15 years has served as publicity manager, in which capacity he has had charge of all phases of the company's advertising. Mr. Fechheimer is a graduate of the University of Michigan.

* * *

Fred Swanson, who recently joined the H. K. Ferguson Co., Cleveland, engineer and architect, was formerly with the Austin Co., Cleveland, builder, as division superintendent in charge of construction. He was recently made assistant to J. H. Ruble, vice president of the Ferguson company, who is in charge of all construction. Mr. Swanson will be one of the directors of the Ferguson company.

* * *

Frank Garratt, for the past eight years connected with the industrial interests of Latrobe, Pa., has resigned as general superintendent of the Latrobe Electric Steel Co. Mr. Garratt was for several years general manager of the Hudson Reduction Co., manufacturer of metallic and ferrotungsten, and is experienced in the manufacture of high-speed steel and ferrotungsten. Prior to his connections at Latrobe, he was metallurgical chemist for the Firth-Sterling Steel Co., McKeesport, Pa., and was well known in the Pittsburgh district as a tool steel chemist.

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FOREIGN OFFICES

BIRMINGHAM, ENG. - - - - - - - - Prince's Chambers
LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1
PARIS, FRANCE - - - - - - 23 Rue de la Bienfaisance

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1923 a Great Industrial Year

WHEN the final accounts of 1923 are cast up, it will be found that the past 12 months will have registered one of the greatest industrial years in the history of the country. In some respects, the year was without a parallel in the sustained level of plant operations and in the magnitude of general production. Clearly, it was the leading industrial year since the war in point of gross volume. Furthermore, to all appearances, its activity was raised upon a sounder and more staple foundation than its nearest postwar rival, the feverish, abnormal period of 1920. Measuring the flow of all business, railroad traffic in 1923 reached the highest total and the largest monthly average ever known.

Iron and steel production figures accurately point the ranking of the year from an industrial standpoint. In all probability, steel production established its largest peacetime tonnage and was second in all history only to the war year of 1917. The margin between these two records was slight. The total production of steel ingots and castings in 1923 was close to 44,500,000 gross tons compared with 45,060,067 tons in 1917, the high mark for the steel industry. The record of pig iron was even more impressive than that of steel. Total output of coke and anthracite iron, it is indicated, was approximately 40,340,000 tons. This eclipses by a considerable margin the previous high record of 39,434,797 tons in 1916. The necessary concomitant of this large production of iron and steel was a corresponding output in those lines of manufacture for which iron and steel constitute the raw material.

So far as iron and steel is concerned, business is starting in the new year on a slightly lower basis than 12 months ago. This in itself is not of great significance when it is considered that in the present economic situation all fundamentals either are conspicuously favorable or are improving. The outlook points definitely to a continuation through the first half at least of substantially the average industrial activity of the past year. Beyond that it would be hazardous to predict.

Capacity Depends on Maintenance

AS 1924 approaches, many producers of iron and steel are reviewing the new construction record of 1923 in order to obtain a rough idea of the amount of new ingot and finished steel capacity added during the past 12 months. In many cases, the attention given to the number of new furnaces and mills overshadows any consideration of the many existing units that are remodeled, repaired or completely rebuilt during the year.

Although the extent of new capacity is extremely important in analyzing the year-end status of the industry, the condition of the old equipment is of far more consequence in determining a true measure of the production resources of the country. For instance, on Dec. 31 the total annual ingot capacity will be about 55,000,000 tons, of which only 550,000 tons were added in 1923. The real strength of the nation's ability to produce steel, therefore, lies in the furnaces built prior to 1923, which theoretically should be able to produce 54,450,000 tons a year. However, the extent to which each of these units is able to turn out steel depends entirely upon its state of repair. Moreover, it is likely that many furnaces, thoroughly overhauled and modernized, actually produce more steel than allowed for in their original capacity rating.

This is equally true in the case of blast furnaces, rolling mill and fabricating departments. A review of the repairs to blast furnaces during the past few years shows that many hand-filled stacks have been equipped with mechanical charging equipment. The annual reports of the United States Steel Corp. and the Bethlehem Steel Corp.

indicate that extensive repairs have been made in the steelworks and mills of every manufacturing subsidiary.

Figures are not available, but it doubtless is true that the national expenditure for maintenance and repair far exceeds the amount of money spent for new equipment.

Automobile Output Breaks Record

THE automobile industry in 1923 has shattered all records and confounded all prophecies. During the first 11 months of the year the aggregate output of passenger cars and trucks was 3,709,304. A grand total for the year of near 4,000,000 automobiles is indicated.

That figure will exceed the number of all the cars and trucks manufactured by the industry from its birth up to 1916. The 1923 production exceeded that for 1922 by 50 per cent. Compared with the depression year of 1921 a gain of 134 per cent will be shown. It will be remembered that the production for 1922 established a new high mark and led to predictions that it would not soon be equaled or exceeded.

The production of passenger cars during the year increased by 53 per cent over 1922. The record for trucks during 11 months shows a smaller gain, of 49 per cent. For the period 3,361,090 passenger cars and 348,214 trucks were produced.

In November and during the current month operations have undergone a seasonal decline. The November output revealed a drop of 15 per cent from October and of 20 per cent from the year's peak in May. There is no indication, however, that the present decline is the beginning of a major recession in automobile output.

On the contrary the signs all point in another direction. Large companies producing low or medium-priced popular makes of cars almost without exception, have announced plans for a sharp increase in output next year. The Ford Motor Co. expects to bring output up to 10,000 daily average by spring. The General Motors Corp., Willys-Overland and others have announced substantial increases in their schedules.

With this large production it seems inevitable that competition will be exceptionally keen. Companies unable to meet this competition may not fare so well, but the general outlook for the industry is for big production at least during the first six months of 1923.

The automotive industry undoubtedly will suffer fluctuations, like all others, in the future, yet the idea that the automobile is a novelty and luxury has almost completely vanished. It has won its place in the hearts and homes of the American people, by giving them that for which human beings for untold centuries have longed—a convenient means of individual transportation.

The automobile is a part of modern life and it is a big factor in the high standard of living established in this country. The limit of its growth and its saturation point have not yet been seen. The prospect for activity in the automobile industry is a favorable omen in the outlook for the steel industry and all business next year.

Employment Holds Up

TWO facts of special interest to the iron and steel industry are contained in reports issued this week by the United States department of labor. The first is that which shows employment in 7430 representative establishments in 51 manufacturing industries is continuing on a high level. In many economic surveys of recent months there has been comment on a reduction in the number of industrial workers kept at their tasks, and speculation as to further decline. The department of labor's figures encompassing 2,483,431 employes in November does not show a severe falling off. With employment in June representing the index base of 100; the figure for July was 98.2; for August 98; September 98; October 97.8, and November 97.3. The reduction has been less than 3 per cent; no grounds for pessimism in that. The slight reduction from an index of 98 toward the close of the year suggests itself as of a temporary character.

The second fact of importance in the department's report is that in November 112 increases in wages were reported, and 32 decreases. This shows a preponderance of wage increases. No evidence of wage inflation is apparent in figures pertaining particularly to the iron and steel industry. The department reports that for November the average wage paid among 241,478 workers by 190 companies in the industry was $133, compared with $128, an average among 242,171 employes in October. The average in November, 1922, was $119.

The abolishment of the 12-hour day at steelworks, with the raising of the hourly rate of pay has been largely responsible for continuing employment and wages at high levels. The year 1924 dawns with one of the most sweeping changes ever wrought in industry an accomplished fact. Approximately 30 per cent of all wage earners now are on an 8-hour basis, this including all engaged in continuous process operations. The others are working 10 hours. The percentage represents the proportion of 8-hour workers in one of the largest industrial groups of the country, and is fairly representative of the industry as a whole.

Columbia Steel Reports Operating Profit

In a report covering operations for the nine months ended Sept. 30, 1923, the Columbia Steel Corp., Pittsburgh, Cal., shows a net profit for the period of $489,704. Gross operating revenue, which was derived only from merchant mills and foundries, was $799,014. Returns from the operation of the Llewellyn mills at Torrance, were included from April 1, upon which date they were acquired.

Two new 75-ton open-hearth furnaces were completed and placed in operation by the Columbia Steel Corp., Oct. 16. The new rod mill was started Oct. 15. Buildings for the sheet mill have been completed and machinery is now being installed.

A railroad to the company's coal mine at Ironton, Utah, was completed Aug. 1. The first unit of the mine has been developed and its output is being sold pending the completion of the coke ovens at Ironton.

The income account of the Columbia Steel Corp. for the nine months ended Sept. 30, 1923, follows:

Gross operating revenue	$799,014
Less depreciation	99,836
Net operating revenue	699,177
Other income	64,513
Total income	763,690
Less fixed charges	203,633
Profit before taxes	560,057
Less federal tax reserves	70,352
Net profit to surplus	$489,704

Dollar's Purchasing Power 60.5 Per Cent of 1914

The cost of living in the United States on Nov. 15, 1923, had increased seven-tenths of 1 per cent over the level of Oct. 15, 1923, as shown by figures collected by the National Industrial Conference board in a survey of conditions the country over. The increase since last July was 2.1 per cent. In the month, there were increases in the average cost of food and sundries. Average rents advanced, but the cost of clothing, coal, gas and electricity were lower. Between July, 1920, when the peak of the rise in the cost of living since 1914 was reached, and November, 1923, the cost of living decreased 19.2 per cent. The increase since July, 1914, was 65.3 per cent.

The purchasing value of the dollar based on the cost of living in November, 1923, was 60.5 cents as contrasted with $1 in July, 1914.

Gulf States Retires Stock

The Gulf States Steel Co., has purchased approximately 75 per cent of the $60,000 of 6 per cent second preferred stock outstanding, leaving $2,000,000 7 per cent first preferred and about $15,000 second preferred ahead of the 112,120 shares of common stock. Gulf States has no funded debt, the $149,000 of Self-Fluxing Ore & Iron bonds outstanding Dec. 31, last, having been retired in June.

Canadian Car Net Gains

The annual report of the Canadian Car & Foundry Co., Ltd., Montreal, and its subsidiaries, covering the combined operations for the fiscal year ended Sept. 30, 1923, shows profits for the year of $1,427,573, as compared with a deficit last year of $586,632. From the net income a dividend of 7 per cent on arrears of preferred stock was paid, amounting to $525,000, leaving a surplus of $902,573, or 18.1 per cent on the $4,975,000 common stock outstanding. Surplus on Sept. 30 was $3,560,148. Preferred dividends in arrears on Sept. 30 amounted to 8¾ per cent.

Common stock of the Wolff Mfg. Co. Chicago, manufacturer of plumbing supplies, has been increased from 100,000 to 250,000 shares of no par value. New York interests recently assumed control of the Wolff company and Dr. J. T. Duryea, president of Pierce, Butler & Pierce, was made president.

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Automobile Output Shows Gain Over 1922

Washington, Dec. 24.—The official total for the production of automobiles in November has been issued by the department of commerce. The month's record was 284,680 passenger cars and 27,914 trucks, making a total of 312,594. This is a decline of 14 per cent from October and of 20 per cent from the year's high month of May. It showed a gain over 31 per cent over the record for November, 1922, and of 170 per cent over that month in 1921. The 11 months total for passenger cars and trucks was 3,316,000, and a record of about 4,000,000 is indicated for the full year, against 2,659,000 in 1922. The figures are on reports from 186 manufacturers. The production of automobiles and trucks by months follows:

Passenger Cars

	1921	1922	1923
January	.....	81,696	223,819
February	.....	109,171	254,773
March	.....	152,962	319,770
April	.....	197,224	344,639
May	.....	232,462	350,410
June	.....	263,053	337,362
July	165,616	225,086	297,330
August	167,756	249,492	314,373
September	144,670	187,694	298,911
October	134,774	217,566	*335,023
November	106,081	215,352	284,680
December	70,727	208,010	.....

*Revised.

Trucks

	1921	1922	1923
January	.....	9,576	19,720
February	.....	13,350	22,161
March	.....	20,022	35,260
April	.....	22,640	38,056
May	.....	24,097	43,678
June	.....	26,298	41,145
July	11,136	22,046	30,663
August	13,400	24,692	30,829
September	13,978	19,462	*28,638
October	13,149	21,795	*30,166
November	10,487	21,949	27,914
December	8,656	20,354	.....

*Revised.

Transue Shows Gain

The report of Transue & Williams Steel Forgings Corp. for 11 months ended Nov. 30 shows net sales of $5,633,000 against $3,800,000 in same period of 1922. Net earnings totaled $403,718 after all deductions including taxes against deficit of $60,782 in previous year. As of Nov. 30, current assets stood at $2,871,525 and current liabilities $266,949.

Mill Operation Steady

Chicago, Dec. 24.—General operations of the Illinois Steel Co. continue at about 75 per cent of capacity. It has 19 out of 27 steel-works blast-furnace stacks blowing. The Inland Steel Co.'s rate also is 75 per cent. Inland officials state that in the first quarter their operations will be limited only by their ingot capacity. All operations but in continuous departments will be suspended Christmas Day.

The Business Trend

December 27, 1923

BY JOHN W. HILL, FINANCIAL EDITOR

IN THE midst of the holidays, business is witnessing its customary letdown. It is approaching the new year, however, with many evidences of an improvement in tone.

Steel consumers are showing increasing interest. Pig iron prices are up slightly in some sections. Copper firmness is maintained. Christmas retail trade is favorable and the stock market has been registering confidence.

Of considerable significance has been the improvement in a number of industries recently lagging. Daylight has appeared in oil, with reduced outputs and price advances. Tires are gaining. Leather is more encouraged.

Even the shipbuilding industry is feeling the stimulus of substantial improvement. Large orders have been placed for new ships, reflecting demand for coastwise and inland waterway vessels.

Tax Bill Wins Point

Political events have helped improve sentiment. Congress has adjourned for the holidays but not before voting the tax reduction measure right of way in committee over the bonus bill. This is a good omen. Henry Ford has simplified the elections next year by announcing himself for Coolidge.

Good news comes from the department of agriculture. It estimates the value of 1923 crops at $8,322,695,000. This is a gain of 11 per cent over 1922 and of 50 per cent over 1921. The corn crop leads with a value of more than $2,000,000,000. Cotton is second.

The decline of 17 per cent in wheat explains the gloom of wheat growers. They are deserting this crop. The December report of wheat acreage shows a reduction of 12 per cent from one year ago, to the lowest point since 1913.

Wheat in Over Supply

That is sensible. A world over supply of wheat exists. The war caused a great increase in acreage. World wheat crops in 1923 gained 11 per cent and world imports will be 50,000,000 bushels less. Russia with a larger yield has shipped her first cargo of grain to England since 1914.

Except for wheat, farm conditions are better. Farm product prices in 1921 got as low as 20 per cent below the general commodity price level. In December, according to the bureau of labor statistics wholesale price index, they were only 2 per cent under the general average.

The railroad outlook is good. Reliable estimates are for an outlay of $1,500,000,000 for equipment by the railroads in the next two years.

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One month ago	One year ago	1913
Business failures...	...	438	406	440	...
Cash Ratio Fed. Res. System %..	75.7	75.3	77.1	72.8	...
N. Y. per cent.. Loan Rate, 4-6 mo.	5	5	5¼	4½	5½
Aver. 25 industrial shares	$108.13	$108.98	$106.74	$109.08	$58.19
Average 25 railroad shares	$57.38	$58.24	$58.95	$61.71	$82.90
Average 40 bonds.	$76.55	$76.60	$76.36	$78.89	$93.00
Car loadings (week ended Dec. 8....	913,774	835,296	1,036,067	990,174	*837,953
Bank Debits, 244 cities (000 omitted	.....	$9,711,409	$11,027,000	$8,860,000	.....

*1920.

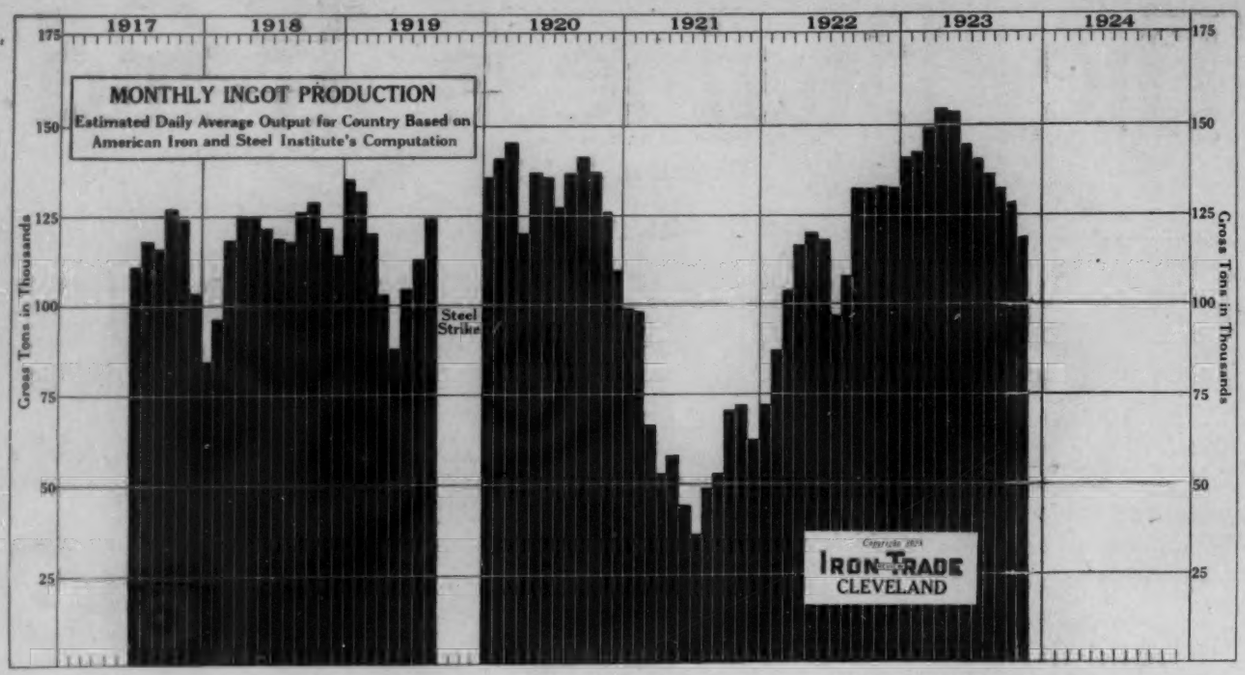
FOREIGN EXCHANGE (Demand)

	Normal	Last week (Close)	Week before	Month ago	Yr. ago
Sterling ..6.....	$4.86	$4.35	$4.36	$4.37	$4.64
Francs	19.3c	5.17c	5.31c	5.44c	7.4c5
Lira	19.3c	4.32c	4.34c	4.34c	5.09c

MONTHLY COMPARISON

	November	Month before	Year ago	Monthly average 1913
Dodge building Awards in 36 states	$318,828	$360,687,000	$265,000,000	$82,126,000
Business failures: Number	1704	1673	1737	1336
Liabilities	$50,291,708	$79,301,741	$40,265,927	$22,732,000
Exports	$404,000,000	$402,000,000	$380,056,000	$207,000,000
Excess of gold imports	$39,011,000	$28,550,000	$17,400,000	†630,716
Bureau of Labor Price Index....	152	153	156	100
Bradstreet's Price Index	145.4	141.6	149.1	100
Economist's British Price Index	4541	4320	4283	2717
Cost of Living Index	165	164.1	158.4	100
New incorporations	$909,693,800	$700,708,300	$843,652,900	$172,301,000
Railroad net earnings ...	*$102,746,000	$92,200,000	$85,205,000	$59,301,00*

†Monthly average excess exports. *October.

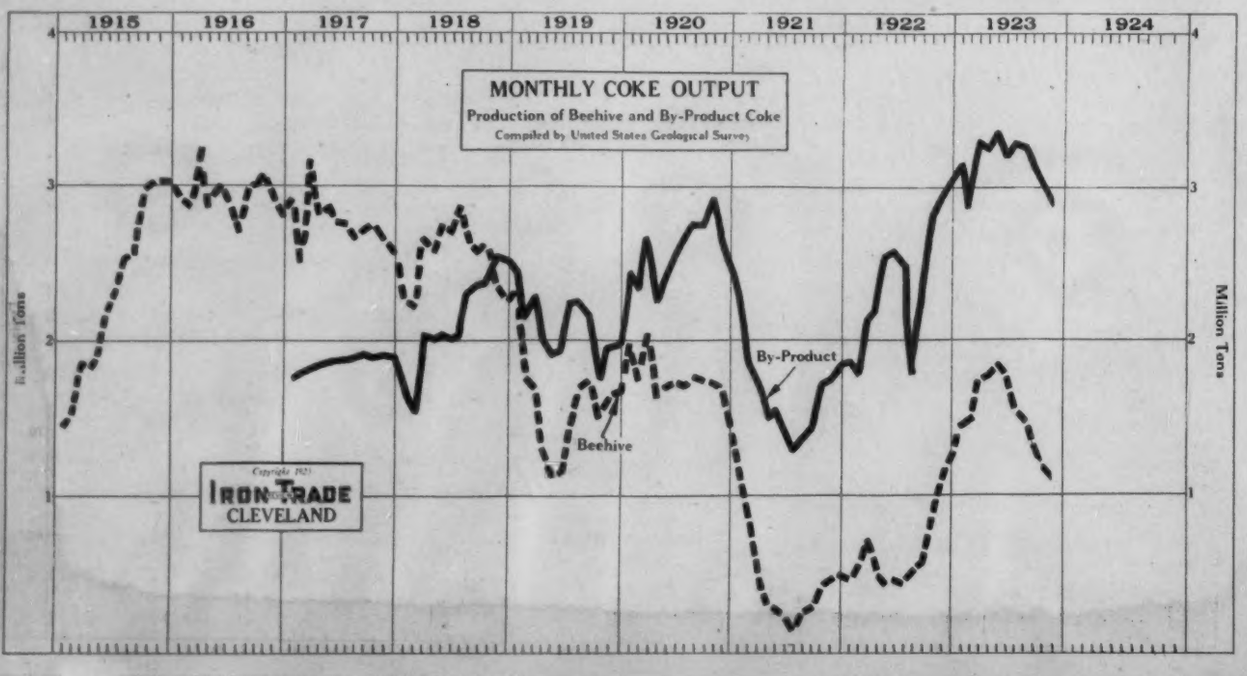


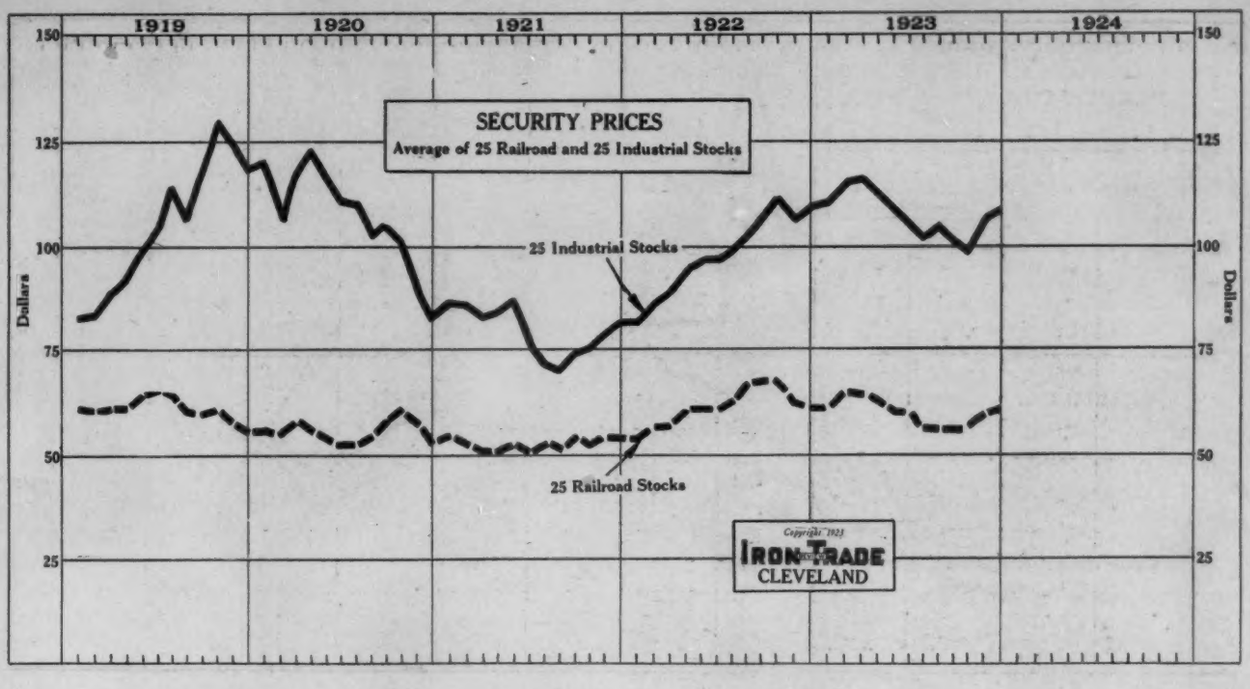
Monthly Ingot Production

THE decline in steel ingots in November was the most precipitate of any mon h since August, 1922. The daily average output for the period was 119,762 tons, a recession of 8.8 per cent from October. November was the seventh consecutive month to show a loss in ingot output. It stood 24.1 per cent below the high point touched in April. The month's output was at the annual rate of 37,126,000 tons. The indicated 1923 production of ingots of around 43,000,000 tons will be second only to the great war year of 1917.

Monthly Coke Output

OUTPUTS of both beehive and by-product coke continued to decline in November. The production of beehive was 1,103,000 net tons, a drop of 14.5 per cent from the October figure. The record of by-product output was 2,942,000 tons or 5 per cent less than in October. A considerable part of the decline was due to the smaller number of working days, and the daily average production for by-product actually gained 1.3 per cent. Coke buying is lagging with buyers and sellers maintaining a deadlock.



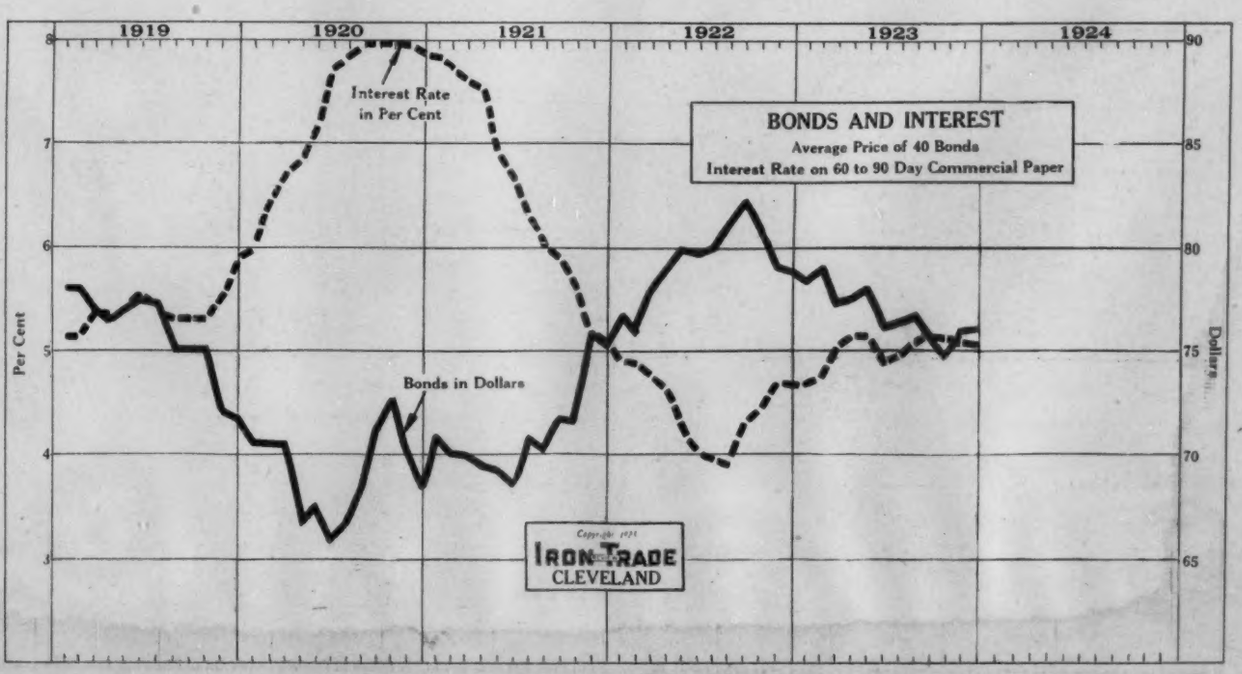


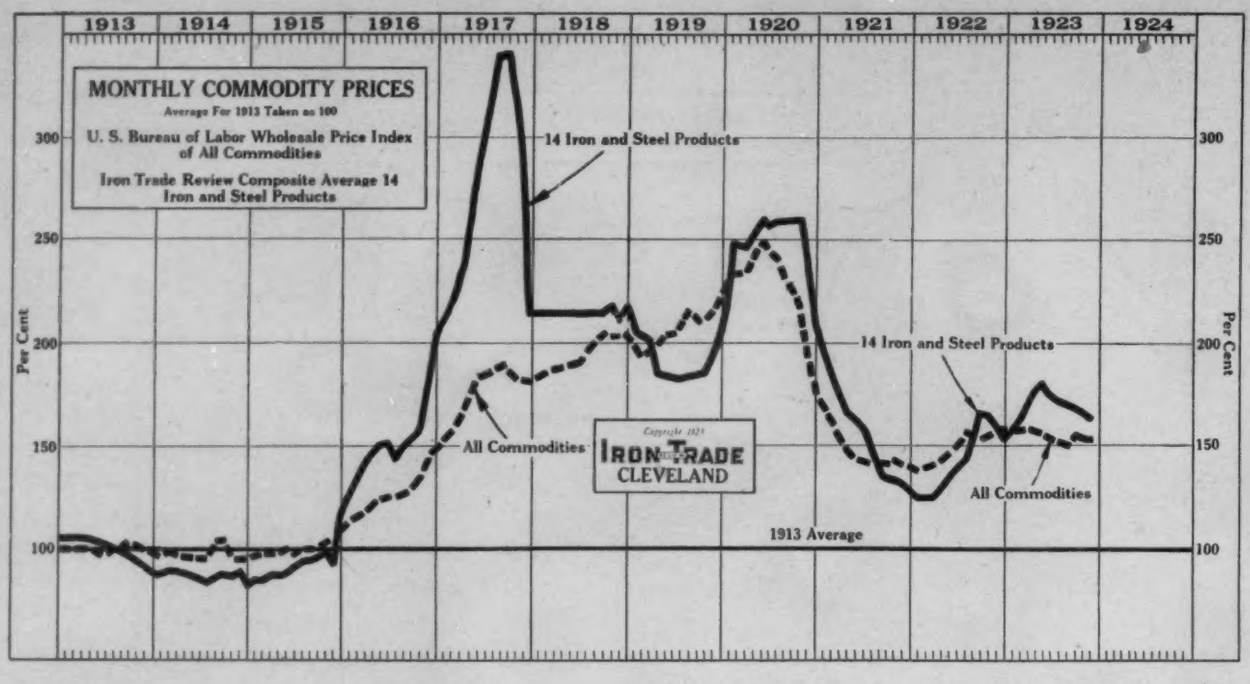
Security Prices

THE great stream of immigration during the first part of the fiscal year has exhausted the quotas of a number of European countries. That will shut off further arrivals from those countries until next July. The number of aliens admitted since July 1 has been 277,029, leaving a balance for the year of only 72,816 of all nationalities. The immigration in September amounted to 89,431 and the emigration to only 6073. Although large numbers are arriving, only 14 per cent of recent totals were classed as laborers.

Bonds and Interest

INTEREST rates have continued to show a weakening tendency under the influence of diminished demand for funds and the tremendous credit resources available for the country. Gold still is pouring into the country, the aggregate of imports for 11 months of 1923 being $290,000,000 while exports were only $27,000,000. This is piling up a huge credit reserve which is being reduced by increasing the circulation of gold certificates. With easy money bond prices have continued to maintain strength.



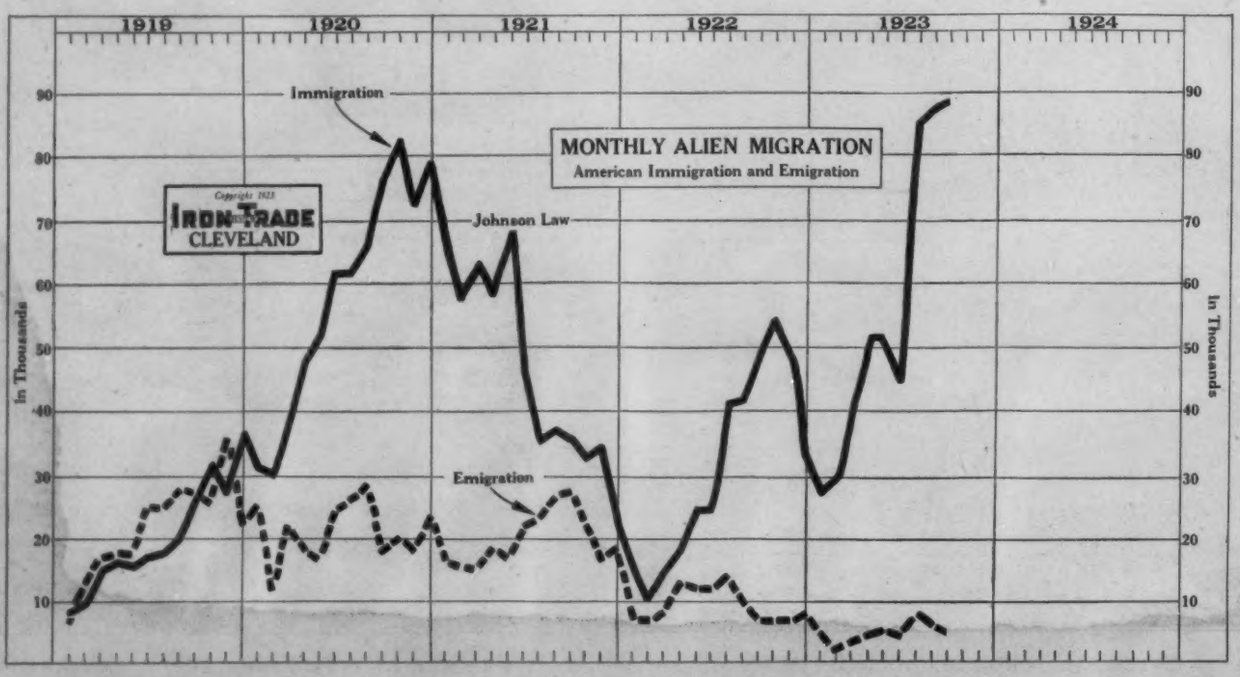

MONTHLY COMMODITY PRICES
Average For 1913 Taken as 100
U. S. Bureau of Labor Wholesale Price Index of All Commodities
Iron Trade Review Composite Average 14 Iron and Steel Products
14 Iron and Steel Products
All Commodities
14 Iron and Steel Products
All Commodities
1913 Average
IRON TRADE
CLEVELAND
Per Cent
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924
300 250 200 150 100

Monthly Commodity Prices

THE bureau of labor statistics index for commodity prices on Dec. 1 stood 52 per cent above 1914. This was a fractional decline from the previous month. The index has been receding since October. It now stands 4.4 per cent below the year's top and 2½ per cent under one year ago. Declines occured for fuel, building material, and house furnishing goods, while farm products, food and clothing advanced. IRON TRADE REVIEW market average remains above the general commodity level, at 61 per cent above 1913.

Monthly Alien Migration

SECURITY prices have been firm and active since the last week of October. Previous to that time they had been declining since March. Twenty-five industrial stocks have regained in less than two months, 60 per cent of the ground lost in eight months. Twenty-five railroads have recovered more than 40 per cent of the lost ground. The aggregate value of about 200 leading issues has increased more than $1,000,000,000 over the year's low point. Confidence in the outlook has been indicated.



Japan Studies Rebuilding Plans

Rehabilitation Involves Replacing of Many Bridges, Miles of Railroad, Dock Equipment, etc., in Addition to Buildings—Subway and Elevated Lines Planned —Temporary Houses Now Being Constructed

BY ICHISUKE TAKANO
Japanese Correspondent, Iron Trade Review

TOKIO, Japan, Nov. 30.—Japan's purchase of building materials, thus far from the United States and Great Britain, has been considerable but only a prelude to the real reconstruction purchases that will follow. The Japanese government, desirous of preventing any recurrence of such disasters, plans to rebuild Tokio and Yokohama in a new way. Pending its program it withholds building permits. Instead of permanent offices, stores, godowns or residences people are permitted to build only temporary sheds. The new ci ies are to be built with materials still to be manufactured at home or purcha ed abroad. What is required for reconstruction or how much is a problem which the iron and the steel trade in Japan and abroad is more interested in than purchases thus far made.

On this point opinion differs even among experts. Some give a huge tonnage of structural steel for the next five years. Others believe a much wider range of iron and steel material will be required but a tonnage only slightly above Japan's normal annual requirements. As this has an important bearing on prospects for the iron and steel trade it is of interest to study what will determine the materials Tokio and Yokohama will require.

The devastated area in Tokio represents 44 per cent but the percentage of buildings is much higher. The official census notes that 407,992 houses out of 638,865 were destroyed by earthquake or fire. The ratio is 64 per cent. At Yokohama 18,149 houses were demolished by the quake and 55,826 destroyed by fire. Out of 93,840, 19,865 were left. Only a few were habitable. In both cities commercial and factory quarters were nearly entirely wiped away. Only residential quarters in the upper towns were left. In Tokio a cluster of office buildings near the imperial palace escaped.

Classify Buildings Destroyed

The figures include the factories destroyed. A classification of buildings destroyed in Tokio, numbering 218,901, just prepared by the Tokio city office, shows that 18,364 factories and godowns were destroyed, with the exception of minor shops and warehouses. Theaters and similar structures number 248. Office buildings destroyed or half demolished number 4470. School and libraries number 1386. Large residences destroyed wholly or partially number 188,734.

In Tokio 151 bridges were destroyed. At Yokohama there were not so many but those were completely shattered. Even iron or steel bridges were twisted and broken and must be replaced.

Railways and tramways suffered much from the earthquake and fires. The Government Railways of Japan lost roughly 1300 cars of all kinds and several transformer substations. The stations demolished numbered nearly a dozen. The Tokio Electricity bureau lost nearly 800 cars and several barns. The Yokohama Electricity bureau lost nearly all cars.

The damage is variously estimated. The Government Railways' damage only is placed at 75,000,000 yen. The loss of the Tokio Municipal Electricity bureau is announced by the bureau itself at 40,000,000 yen. These figures may suggest the immense loss.

How to replace the damaged buildings and rebuild is being considered by the board of reconstruction appointed immediately after the disaster. Its decisions are a factor, next in importance to the extent of the damage, to determine reconstruction needs. The board is slow

FIG. 1—A VIEW OF YOKOHAMA HARBOR SHOWING PART OF QUAYS WRECKED BY FIRST SHOCK SEPT. 1. EXTENSIVE NEW DOCK EQUIPMENT PLANNED

FIG. 2—WRECKS OF BRICK BUILDINGS IN TOKIO. THE REINFORCED CONCRETE STRUCTURE IN THE BACKGROUND STOOD THE QUAKE BUT SUFFERED FROM FIRE

to mature its program. What it has decided upon is the principle to be followed in widening old roads and laying out new ones. There should be no roads in Tokio at least in the devastated zone less than 18 feet wide. The most important main roads are to be 144 feet wide. The less important main roads are to be less than 144 feet wide but not less than 78 feet. These main roads number 35. The area occupied by those main roads is estimated at 7,800,000 square feet.

The board of reconstruction in principle has decided to introduce an important change in the system of tramways and railways in Tokio. At present the total mileage of the Tokio city electric car service is 125 miles. The mileage is to be increased to 200 miles, part of the old lines to be relaid, with some subways. The Government Railway of Japan is to hurry up the construction of its overhead electric railways which connect its interurban railways with one another better than at present. The rough estimate of the subway mileage is not yet made but it is believed it will not be less than 5 miles. The new overhead railways are estimated at 2 miles.

In harbor reconstruction at Yokohama the board of reconstruction plans to go a little farther than merely rehabilitation. More quays, walls and warehouses are to be built to accommodate a large trade. Some sections of the public demand the mouth of the river Sumida be dredged and turned into a big river port, but the plan in favor of Tokio is not approved by the board of reconstruction. It will dredge a spot near the mouth of the river and build a breakwater. There quay walls, quays and other kinds of harbor accommodation are to be constructed. The spot will be made fit for entrance of freighters of less than 5000 tons. Canals in Tokio and Yokohama are to be dredged and widened while a new canal be cut along the railway line between Tokio and Yokohama.

The cost of reconstruction plans now outlined according to the board of reconstruction's draft program is estimated by the government at 900,000 000 yen, exclusive of expense to restore or extend railway and tramway systems. It does not touch reconstruction of offices, factories, stores, godowns, residences, bridges and other edifices.

From the viewpoints of the iron and steel trade this is the most important part of the reconstruction. The bridges in the devastated area nearly all were destroyed. In Tokio 151 bridges have to be reconstructed. The construction of bridges is in the hands of municipal authorities and their opinion is decisive. Before the earthquake the Tokio city office was rebuilding bridges in the main part of the city. As materials iron and stone were preferred. Wood was avoided as far as possible. Sidewalks on bridges were built with wood or wood blocks. The experience of the great disaster shows that it was ill advised. The municipal expert in charge of bridges says that the partial use of wood before the earthquake was dangerous. During the dark days of quakes and fires many bridges partially of wood being instrumental in spreading fire and caused the death of thousands. Nothing but iron and steel will be used in rebuilding bridges in Tokio. He estimates the cost of bridges to be built at once at 30,000,000 yen.

In regard to the restoration of buildings the board of reconstruction has only fixed zones for factories, residences, business offices and stores. The concensus of opinion among architectural authorities on the board is that in the factory and the commercial sections of the new Tokio no wooden buildings must be permitted. Even in the residential quarters some restrictions will be placed on the use of wood. Architects in the service of the metropolitan police board who have been studying buildings damaged by the earthquake but not consumed by fire report that in Tokio and suburbs 10,010 buildings were completely demolished by the earthquake, and 8694 partially demolished. Buildings damaged but habitable are 10,594. The most badly damaged were brick and stone. Wooden buildings stood the test better than brick or stone, but failed to stand the test of fire. The most earthquake and fireproof were reinforced concrete buildings, none being demolished, and only one was badly damaged.

All indications are that only reinforced concrete building will be permitted in the commercial and the factory quarters. At Yokohama, too, this restriction in certain zones is expected to be applied.

FIG. 3—A BRICK-COATED STEEL BUILDING IN TOKIO. IT STOOD THE QUAKE BUT WAS GUTTED BY FIRE WHICH CAUSED COLLAPSE

The temporary buildings now permitted in the devastated zone are of wood and galvanized sheets. They are to be replaced with reinforced concrete in the next three years provided building regulations enacted when people required their habitations after the disaster are enforced in conjunction with the new regulations in regard to the type and materials of permanent edifices to be enacted soon.

If Tokio and Yokohama have to build roughly 500,000 buildings in three years the tonnage of structural materials will be large. The only check is want of capital. It is plain that after the loss of property and business worth more than ten billions, citizens can not stand so much expenditure in such a short period. This causes many people in the steel line to estimate reconstruction needs at a comparatively small figure, at least for the present.

A government expert, for instance, says that architectural authorities urge buildings in the new Tokio and Yokohama to be confined to reinforced concrete on the ground that they stood the test but that they ignore the important fact that the disaster was made so serious not because of the materials of buildings but because of the incapacity of fire forces in Tokio. Moreover they overlook the traditional mode of life of a people with a history of thirty centuries, Japan's climate which requires light and open dwellings and the capital resources of sufferers. If the board of reconstruction tries to force the impossible on people it will be confronted with difficulty.

His study causes him to estimate the possible needs of structural steel for building purposes at 2,000,000 to 2,500,000 tons, which tonnage can not be consumed by Tokio in a year. Even in three years that tonnage can not be used because of the lack of labor and capital. It will take five years to consume it. When the decline in consumption owing to destruction of factories is taken into account the possible annual increase in Tokio's consumption of structural materials for reconstruction will be not more than 300,000 tons.

If this view is correct, reconstruction of Tokio and Yokohama will not prove a drain on the world supply. However, the board of reconstruction is disposed to force its idea and a subsidy program is being framed. Its plan, though still secret, is expected to consist in advancing low interest funds to people or groups who are inclined to construct their offices, stores, godowns or residences in accordance with the idea of the board. The treasury is stated to be ready to place 50,000,000 yen at the disposal of the board of reconstruction for the subsidy.

Although some doubt if the treasury can afford to set aside so much for that purpose when it is compelled to tax its best brains for readjustment of revenue and expenditure, the plan is considered by a large number of men to be feasible. Some cement manufacturers have started the enlargement of their mills on the strength of that idea. In iron and steel lines, also, new enterprises are being considered. Already a new furnace has been constructed at one of the mills near Yokohama.

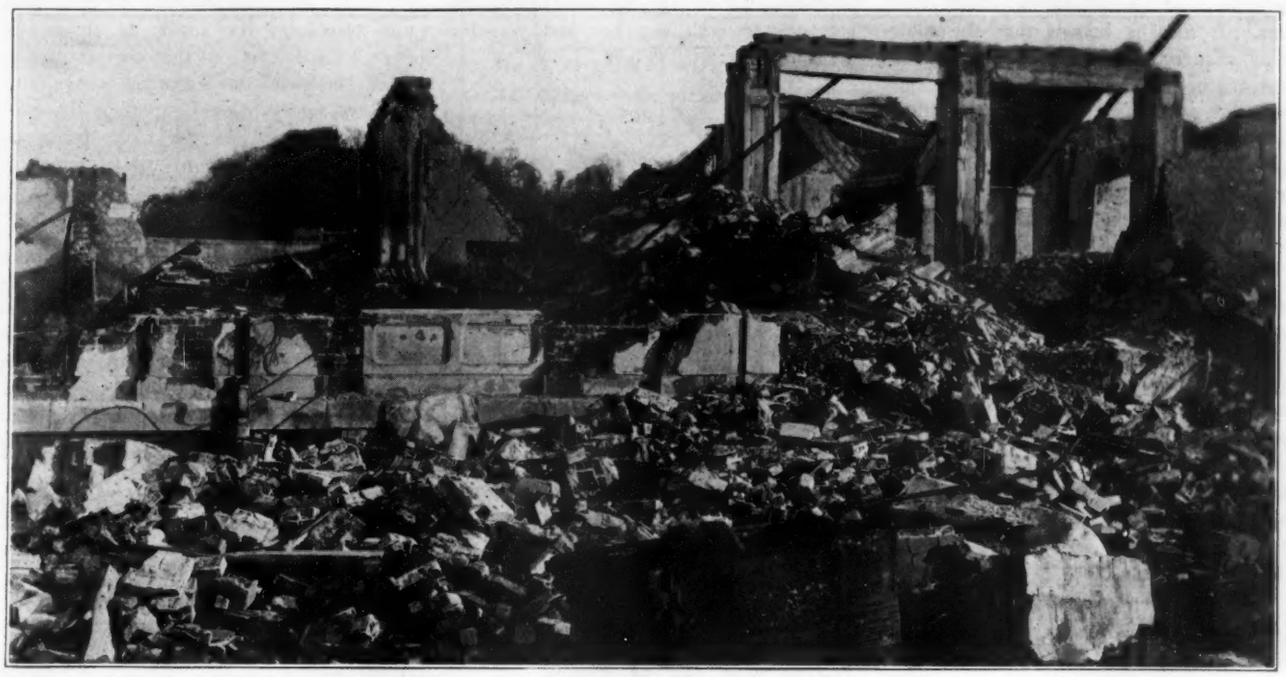


FIG 4—RUINS OF FASHIONABLE HOTEL AT YOKOHAMA. THIS STRUCTURE WAS A CONCRETE-COATED BRICK STRUCTURE

Offer Standard Crucible Sizes for Approval

Standard sizes for brass crucibles, as adopted by the Plumbago Crucible association, recently were submitted to the American engineering standards committee for approval. These standard sizes were developed originally by a committee under the auspices of the American Institute of Metals consisting of crucible users and manufacturers. The work was begun in 1913 and completed in 1915. In 1919 at the instance of the American Institute of Metals, a vote was taken on the formal approval of these sizes as standards, but on account of disagreement the standards never were put in actual use.

In view of this fact, a member of the Plumbago Crucible association was employed to work out a definite and comprehensive plan of standard sizes. This work was done on the basis of the shape that had become established through long use and in a series in which every size of crucible bore a definite relationship to every other size and was susceptible to calculation of its capacity by the same formula. In working out the series, certain adjustments were made to avoid confusion with existing sizes and to permit specifying as nearly as possible of the same size number in the new line of crucibles as in the old line. All but two crucible manufacturers who make crucibles for brass foundry use have made molds to conform to the new sizes.

Examines Mass Effect On Iron

Tests Made To Determine the Chemical and Physical Phenomena Occurring in Cast Iron as Affected by Rate of Cooling—Pouring Temperature and Rate of Filling Mold Shown To Be Factors

BY O. SMALLEY

THE information available regarding the chemical and physical phenomena occurring in cast iron, as affected by rate of cooling, is meagre. However, it is well known that large castings present many difficulties which do not exist in producing small castings. It also is known that the molecular changes of gray iron on solidification are both complex and uncertain, and that the properties of a casting will be determined by their nature and magnitude; that is, the strength and solidity bear some relation to the time and temperature of the metal solidifying in the mold.

The author is not aware of any attempt at systematic investigation of the mass problem. It assumes proportions of huge dimension, and presents a fertile field for research to which the contributed co-operative effort of many investigators is necessary for its scientific understanding. This paper, then, does not more than present the subject as a whole for discussion, and indicates the mode of attack made by the author.

Technically, the laws involved in this study are those of mass action and heat transfer. The law of mass action tells us when and in what direction an equilibrium will be changed by an increase of concentration; that is, a pressure of any one component of a chemical reaction. The complexities of this with regard to cast iron are only too well known. The law of heat transfer is even more involved. The governing factors in the transfer of heat between the fluid metal and the mold which affect the solidity of a casting are:

The degree of superheat in the metal;
Its latent heat value;
Volume changes on solidification;
Dimension and form of casting;
Initial temperature of the mold;
Heat conductivity of the material from which the mold is made;
Heat capacity of the mold.

Difficult of Expression

These factors are not represented easily by a single term, and always will render the law of relation between mass and the physical properties difficult of mathematical expression. Such variables make it impossible to consider the laws to any length in our present state of knowledge of the subject, and the author only essays to project the more salient practical aspects of the mass problem, which are of immediate importance to both engineer and foundrymen, namely:

The time factor for various sections of cast iron to solidify under known condition;

The effect of chemical composition on the solidity penetrating power of gray cast iron;

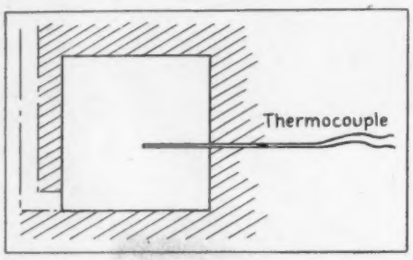


FIG. 1—THERMOCOUPLE IS INSERTED IN MOLD TO MEASURE COOLING RATE OF CASTING

The relation between the chemical and structural changes as effected by time and temperature; that is, to correlate texture with rate of cooling and discuss the means permitted in the control of the same;

To consider briefly the adoption of some simple standard of solidity and to proceed from this to discuss the effect of design on the strength in normal casting;

The rate of running to the mass effect, and to discuss its possibilities and limitations in its application of the manufacture of solid castings without risers.

Time Is Studied

The object of this investigation should be understood clearly. It is to ascertain the time taken for various sections of cast iron to solidify under known conditions. For purposes of comparative data as many variables as possible have been eliminated, excepting the one under consideration in each case. As it was essential to obtain some degree of accuracy, laboratory conditions were reproduced as closely as possible. The section chosen was the ordinary square commencing with 2, 4, 6 and 8 inches respectively. The molds were made in dry sand and consisted of 12 parts of ordinary floor sand, 8 parts of earth loam and 2 parts of saw dust thoroughly mixed together.

These were baked at 400 degrees Fahr. and allowed to cool to 100 degrees for castings. Each mold was made under similar conditions and well vented. A platinum, platinum-rhodium thermocouple was placed in the mold, as shown by Fig. 1, and cast in the center of the block so that the recorded time temperature figures would represent the conditions operating in the mold from incipient solidification to room temperature.

Delicate Heat Measurement

The thermocouples used were made from the same batch of wire and calibrated to a standard instrument to an accurate of plus or minus 2 degrees at 2370 degrees Fahr. The thermocouple was protected by means of a fine silica tube fastened in the mold. The metal was melted in an 8-ton cupola using the following mixture:

448 pounds East-coast hematite, pig iron, mixed numbers.
672 pounds Cleveland pig iron.
1120 pounds machinery scrap.

This was calculated to yield the following composition:

	Per Cent
Total carbon	3.2 to 3.5
Silicon	2.0
Manganese	0.7
Phosphorus	0.9
Sulphur	0.06

The temperature of the metal on leaving the cupola was 2515 degrees Fahr. It was run into a 1-ton ladle and each casting was poured at approximately 2400 degrees Fahr. Each block was poured quickly from the bottom, the area of the ingate being adjusted so that the time to fill each mold would be approximately similar.

Time readings were commenced from the maximum temperature recorded by the pyrometer measuring the time for every fall of 20 degrees Fahr. Curves *A*, *B*, and *C*, Fig. 2, represent the time-temperature curves obtained from these blocks. Details of the relative time occupied in the solidification of each are as follows:

Temperature Range	Time Min.	Time Sec.
2 and 4-inch Blocks		
Main solidification: 2130 to 2078 degrees Fahr.	10	35
Incipient solidification to phosphide eutectoid: 2130 to 1715 degrees Fahr.	23	15

Abstract of an article presented at the International Foundrymen's congress, held in Paris, Sept. 12 to 15.

6-Inch Block		
Main solidification: 2160 to 2060 degrees Fahr.	28	42
Incipient solidification to phosphide eutectoid: 2160 to 1715 degrees Fahr.	65	65
8-Inch Block		
Main solidification: 2180 to 2060 degrees Fahr.	63	..
Incipient solidification to phosphide eutectoid: 2180 to 1715 degrees Fahr.	145	..

It may be observed that the time occupied during solidification of large masses of iron may reach alarming figures and that, even for ordinary castings, ample opportunity is given for manifestation of the principal operative forces in the mold responsible for the commoner metallurgical defects; namely, volume changes on solidification, expansion or contraction, crystallization, and liquidation.

Makes Test Blocks

To determine the part played by chemical composition on mass effect as far as solidity is concerned, a set of 6-inch cubes was cast in dry-sand molds poured from the bottom, and at the same rate and under similar conditions as far as was practicable. The temperature of each mold on casting was controlled between 100 and 110 degrees Fahr.

The series contained irons of the following composition:

	1	2	3
Total carbon	3.12	3.27	3.40
Silicon	2.49	1.15	1.20
Manganese	0.52	0.62	0.63
Phosphorus	1.28	1.54	0.09
Sulphur	0.050	0.086	0.063

Each was melted in an 8-ton cupola and poured with 10 per cent superheat. Etchings taken from each cube, after sectioning vertically through the middle, showed that iron No. 3, containing 1.20 per cent silicon and 1.09 per cent phosphorus, was equally solid throughout, while the others were more open grained toward the center.

Where adjustments of the ordinary chemical elements, silicon, sulphur, phosphorus and manganese are limited, the degree of solidity penetrating power may be increased by the introduction of special metals such as copper, nickel, chromium, molybdenum and tungsten. To illustrate this point in a more practical way, a series of castings of *T* section was made. When cast in an ordinary soft gray iron, this section invariably exhibits an open texture in the center of the heavy section. When nickel or chromium were added the *T* sections showed that both of the elements not only eliminate the draw at the heavy section, but have resulted in a uniform grain throughout. The relative solidity penetrating power of the two elements may be determined by brinell tests.

In a previous research on this subject the author has been able to show that cupola-melted gray iron of normal chemical composition does not draw on solidification if poured with a sufficient degree of superheat, and if cooled faster than a certain critical rate. In other words, there exists for each grade of cast iron a minimum rate of cooling during solidification which yields, within practical limits, the same grain or density, regardless of section or dimension of the casting when poured with a suitable degree of superheat. What these permitted minimum critical rate of cooling and range of superheat are remains to be scientifically determined, while the explanation of the chemicophysical reactions involved is still a matter of conjecture.

This investigation, once systematically conducted, would provide information that would permit both the engineer and foundryman to specify the grade of iron and the method of construction of the mold to insure the strength and solidity throughout all sections of any casting. This is one of the important researches confronting the Cast Iron Research association, and until such data is forthcoming, the engineer is in the hands of the foundryman, who is restricted by the limitations of his training and past experience.

Broughall, in his well known researches on denseners deals with the practical aspect of the question, and shows how, by speeding solidification of the outer shell of the casting, the natural expansion of the metal is resisted and results in a casting of considerable density.

His theory is that immediately the iron is poured into the chill mold, considerable and definite expansion of the iron takes place, which, being resisted by the mold, is converted into a compressive force which submits the casting to such a tremendous pressure, that the density of the iron is increased. It has been proved repeatedly that rapid cooling does affect this densening, and the author already has shown that it is possible to make any gray iron casting sound, provided that the metal is hot enough, and the rate of cooling sufficiently rapid. The explanation given by Mr. Broughall of the reversal of the expansion forces by the rigidity of the mold, however, remains to be proved, for gray iron may be cast in a rigid mold and present both a pipe and an internal draw.

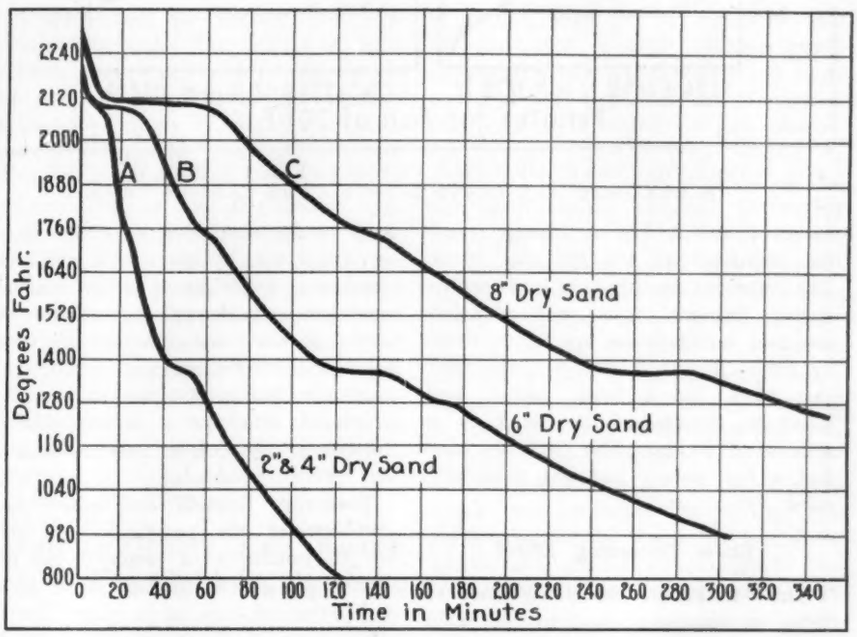


FIG. 2—TIME-TEMPERATURE CURVES OF BLOCKS OF CAST IRON OF DIFFERENT DIMENSIONS

The author inclines to the view that the rigidity of the mold does not enter into the question, but that the non-contracting properties and solidity of gray iron, when poured hot and rapidly cooled, are an effect of, first, a time-temperature balance reaction between the constituents present—chiefly carbon—and the dissolved gas, this latter being retained in solution under considerable pressure and second, of supercooling.

Casts Cube in Chill

To illustrate this, 8-inch cubes were cast from the same melt of iron, poured at the same temperature with the same head and at the same rate. One was cast in the ordinary dry-sand mold, and the other was cast in the same kind of mold lined with 1-inch steel plate. Cooling curves were taken from each block in the manner previously outlined. A comparison of inverse rate

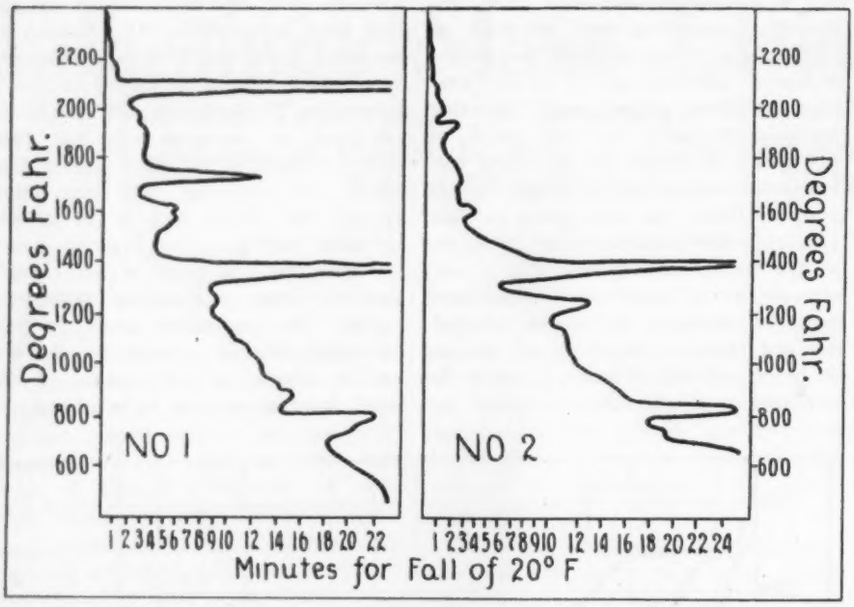


FIG. 3—COOLING CURVES OF 8-INCH CUBES—CURVE 1 TAKEN ON CUBE CAST IN DRY SAND AND CURVE 2 FROM CUBE CAST IN CHILL

curves 1 and 2, Fig. 3, clearly reveals the surfusion of the chill-cast block. The relative quantity of heat evolved during incipient, main, and phosphide eutectoid solidifications are better shown by curves 1 and 2, Fig. 4. The sand-cast block had a large, coarse, weak structure, unsound at the center to an area of 2 inches. The chill-cast block had a fine texture and was remarkably solid throughout.

Show Densening Effect

These tests show the strong grain refining or densening effect of the surfusion phenomenon of cast iron. However, its practical application is not limited to the use of the rigid mold or to iron and steel chills. Surfusion is a physical phenomenon affected by the:

Latent heat of fusion values;
Chemical changes in the molten metal;
Temperature of melting;
Temperature of pouring.

It is to these that the explanation of many of the vagaries of structural variance of cast iron of similar chemical composition and of similar section must be sought. It presents a field of research pregnant with possibilities.

Fletcher, in a recent paper, states that silicon slows down and manganese quickens the rate of solidification. It would be interesting to obtain the composition of the irons used in his investigation. The figures shown in the accompanying table were obtained by the author from two phosphoric irons containing 1.15 and 2.49 per cent silicon, respectively.

These indicate that silicon is not appreciable in its influence on ordinary cast iron, while from an extensive series of cooling curves taken under known conditions, it becomes extremely difficult to give an expression with regard to the true effect of either silicon or manganese on this point. Without systematic investigation under standard conditions, considering each of the elements present, one can scarcely draw conclusions on the subject. Similarly the composite whole involves such a labyrinth of data that it is impossible to formulate any definite statements from our present knowledge.

Ronceray, Brunelli and others have demonstrated the possibilities of slow, or jet, running as a factor in the production of sound castings. The potential value of this as a means to obviate some of the common defects due to mass effect remains undisputed. The principle of slow running is to obtain simultaneous solidification conditions throughout the casting. However, this is a factor strictly limited in its practical application, and ceases to be wholly effective as soon as the rate of running permits the natural volume changes of the molten metal on solidification to operate; that is, as soon as the rate of running exceeds the time taken to solidify. The limitations of this principle in its practical application are only too obvious where mass influence is to be met.

Take, for example, the 8-inch sand-cast cube. The time figures for solidification of this mass of metal are 63 minutes from incipient to main solidification, and 82 minutes from main solidification to the complete solidification of the phosphide eutectoid. This gives a total time from incipient to complete solidification of no less than 2 hours and 25 minutes. From curve 1, Fig. 3, it may be observed that incipient solidification of the silico-ferrite commenced at 2180 degrees Fahr., the main solidification at 2110 degrees Fahr., and the block retained this latter temperature for no less than 44 minutes 32 seconds. The time for the development of the primary crystal grains thus occupied altogether 63 minutes, while the phosphide, remaining molten for a further 82 minutes, afforded ample opportunity for liquidation and segregation.

Adjust Pouring Rate

To pour such a casting slowly enough to eliminate ill effects of the natural volume changes, crystallization and liquidation effects of the solidifying metal without speeding the rate of solidification, thus becomes impossible. However, it amply shows that to take full advantage of the factor of rate of running so far as the manufacture of uniformly solid castings without risers is concerned, it must be considered in conjunction with the time taken during solidification; that is, one must adjust the rate of running by the method of molding, temperature of pouring, and the chemical composition.

To illustrate this in a more practical way in regard to its relation to mass effect, consider the problem of casting in sand a cylinder of iron 8 inches in diameter, 12 inches long, and uniformly solid, with ordinary cylinder iron. On first thoughts, it might be contended that such a cylinder only need be run sufficiently slowly to feed out the draw, or that a sound casting would be obtained by the aid of a 4 to 6-inch head and a feeding rod.

To exemplify this, two cylinders were

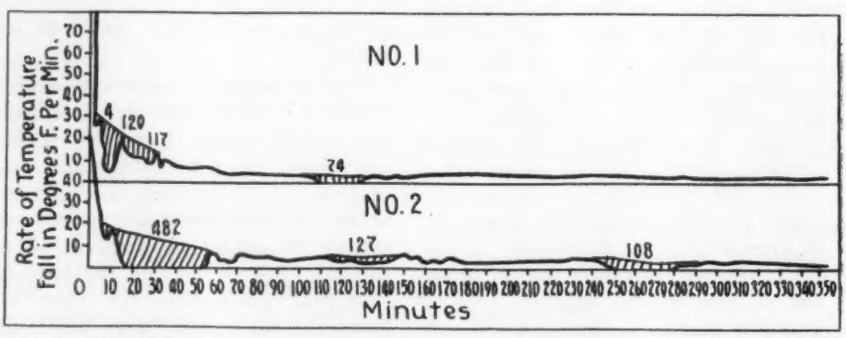


FIG. 4—CURVES SHOWING THE LATENT HEAT EVOLVED ON SOLIDIFICATION OF 8-INCH CUBES, NO. 1 CAST IN CHILL, NO. 2 CAST IN DRY SAND

Effect of Silicon on Rate of Solidification

Total carbon	Silicon	Manganese	Phosphorus	Sulphur	Main solidification Deg. Fahr.	Latent heat of solidification B.t.u.	Latent heat of solidification gram calories	Phosphide eutectoid, deg. Fahr.	Latent heat of solidification B.t.u.	Latent heat of solidification gram calories
3.27	1.15	0.62	1.54	0.086	2057	39	21.7	1755	17	9.5
3.12	2.49	0.52	1.28	0.050	2070	40	22.2	1760	18	10.0

made; the one without any head and running centrally from the top by means of the finest possible jet; the other with 4 inches of head and feeding carefully with a rod. After a series of preliminary experiments, it was found that such a block could, under special conditions be run by means of a jet ¼ inch in diameter, if a large runner basin which has been preheated to 572 degrees Fahr., were used. The mold temperature was controlled at 100 degrees Fahr. The metal was poured with 10 per cent superheat and had the following composition:

	Per Cent
Total carbon	3.21
Silicon	0.60
Sulphur	0.036
Phosphorus	0.77
Manganese	0.62

The condition thus obtained, therefore, were such that, as far as slow running is concerned, the extreme was taken. Incidentally, this experiment offered interesting information regarding the filtering possibilities of small jets.

On being removed from the mold, the casting presented a perfectly smooth and clean skin. It was sound and free from blowholes or other defects. There was no evidence of either piping or sinking, and it would have machined clean on all faces with a light cut. The coarsening of the texture from the outer walls to the center by the slow rate of cooling due to mass was shown clearly. At a position approximately 1/3 the length of the casting centrally from the top, extending about 44 square inches, an internal draw, the enigma and nemesis of cast iron of any dimension, was shown, although the upper 4 inches of the casting was quite sound. On sectioning the block cast with a 4-inch head, which had been fed with hot metal, the same defect was encountered.

This simple illustration suffices to demonstrate the difference between the elementary problem of feeding out the pipe by slow pouring in an ingot of a contracting metal, such as brass or steel, which freeze through a short range of temperature, and the complex problem of preventing drawing of gray iron, a material which expands on solidification and freezes through a wide range of temperature.

Some idea of the length of time the metal remained molten after filling, despite the slow rate of running, is evidenced by the sulphur compounds which rose to the top of the casting, as shown by a sulphur print. Although the sulphur in the iron used was only 0.05 per cent, the upper ¼ inch of the casting was found to contain 0.37 per cent sulphur.

From time to time, the author has had various methods of filtering cast iron submitted to him. The process of these methods never was made clear, but as far as could be gathered, the inventors claimed to remove certain objectionable impurities from the iron and to ensure clean and dense castings. Such devices as strainer cores, jet and slit runners, etc., undeniably justify their adoption. However, these methods always necessitate the use of hot metal, the first essential to clean, sound and dense castings, and safeguard against careless skimming. The metal is not purified by the so-called filtering process. This is a misstatement, calculated to mislead, rather than enlighten, and it is for this reason that reference has been made to it.

Germany Puts Rail Rates on a Gold Basis

The annual general meeting of the German Metallurgical association took place recently at the headquarters of the Society of German Engineers in Berlin, and was well attended. Among the papers read and discussed were the following: "Metallurgy in Technical Management," "Utilization of Ferrous Metals," and "Production of Synthetic Metal Substances by Pressure or Scaling."

The next general meeting of the German Foundrymen's association took place on Dec. 8-9 at Hanover, when the following papers were read: "Present State of Cooling Process in Foundries," and "Development of Economy in the Foundry Industry." On Dec. 8 also, the Society of German Molders held a special general meeting in Hanover.

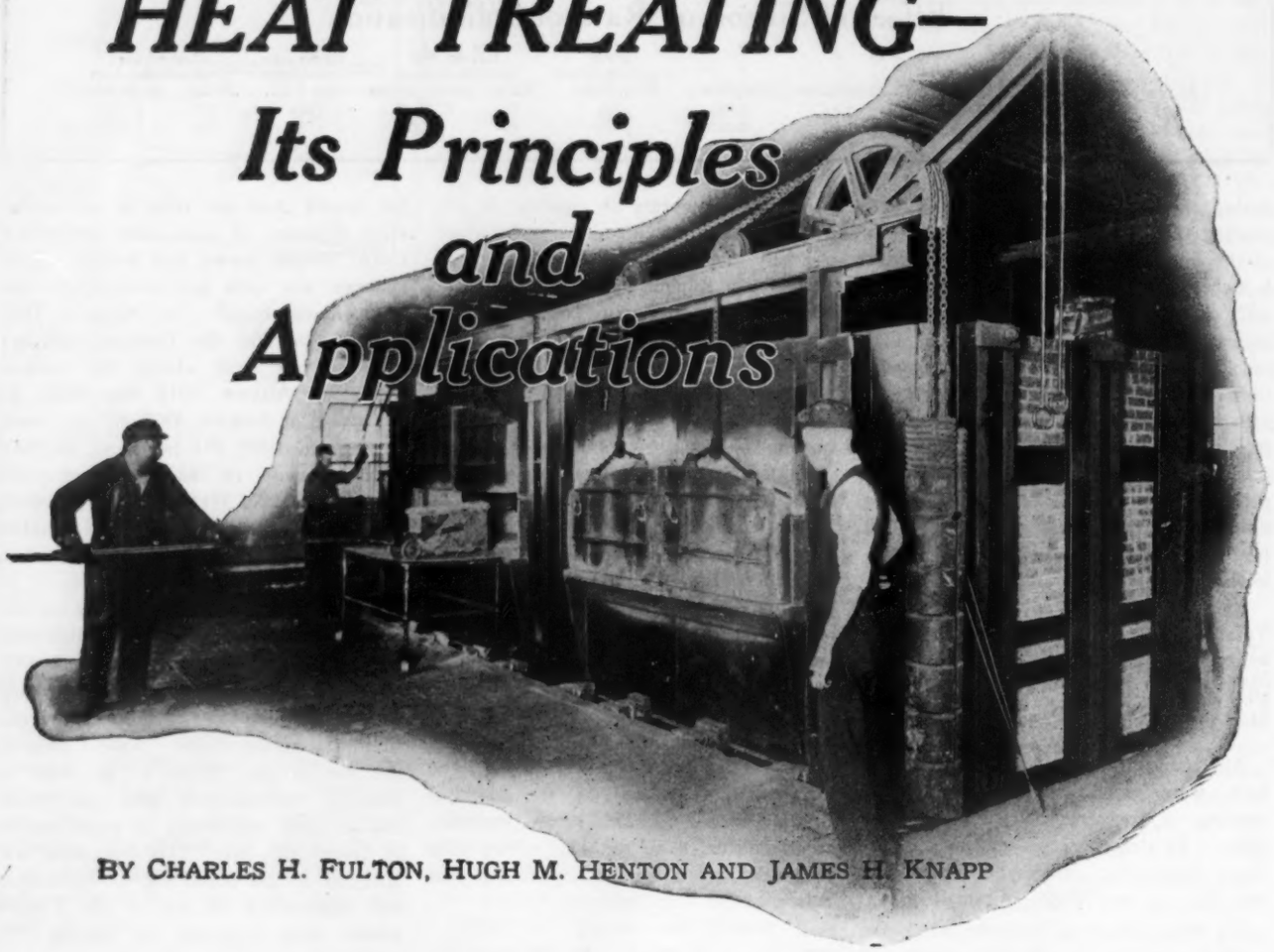
All railway rates have now been put on a gold basis, the rates being amended daily in accordance with the official dollar exchange which is regularly communicated by telegraph to all stations direct from Berlin. A minimum rate has been established for passenger traffic, varying from 90 pfennigs for first class to 10 pfennigs for fourth class per four to six kilometers distance (8 to 1 cent per mile). C.o.d. freight traffic and freight credit charges are only permissible on the gold mark basis. In August, 1917 freight rates on the German railways were 7 per cent above the prewar figure; in August, 1918 they were 23 per cent; in August, 1919, 97 per cent; in August, 1920, 591 per cent; in 1921, 1122 per cent; in 1922, 4989 per cent; in August, 1923, over 6,000,000 per cent, while at the beginning of November they rose to 3,500,000,000 per cent of the prewar figure. With regard to passenger rates 1 tariff pfennig on the last of November equalled 120,000,000 paper marks.

The Rhineland Banks and Bankers' society and the Berlin Revenue Stamp union now have adopted the use of the "M-mark" in order to simplify bookkeeping and the entering of sums expressed in paper marks in documents, etc. This expedient was adopted at the beginning of November and superseded the use of the T-mark which was resorted to during the previous month by which the last three ciphers of a sum was expressed by the symbol "TM"; the newer method will, of course, reduce the number of zeros by six.

The average wage for miners still employed in the Ruhr district after the middle of November was 675,000,000,000 marks per shift, inclusive of all extra allowances, about 625,700,000,000 marks per shift more than the average wage per shift at the end of October. According to the German statistical department, the state index figure for the cost of living during the third week in October amounted to 3,045,000,000,000, or 340 per cent above the figure for the previous week; at the beginning of October it was 40,400,000 times the prewar figure and 38,554,739 above the index figure for the beginning of September.

The A. G. Düsseldorfer Eisenbahnbedarf (formerly Carl Weyer & Co.) in a report issued recently, states that in spite of the occupation it was able to carry on full operations until the middle of November, when freight embargoes came into force and operations had to be reduced to a minimum, but it is hoped to recommence full time working as soon as traffic again becomes normal.

HEAT TREATING—
Its Principles and Applications



BY CHARLES H. FULTON, HUGH M. HENTON AND JAMES H. KNAPP

Chapter III—Relation of Structure to Physical Properties (Concluded)

THE hardness of steel or its resistance to indentation and to abrasion and wear is a valuable property made use of in such parts as gearing, etc., and for cutting tools. The hardness, however, also is a valuable indication of the tensile strength and the elastic limit, and the hardness test is used to make a quick determination of these properties. In the Brinell hardness test a steel ball is pressed into the metal under a fixed load for a certain interval of time, usually 15 seconds, and the diameter of the depression made by the ball into the steel is a measure of the hardness. The formula for deriving the hardness number is as follows:

$$H = \frac{2W}{D(D-\sqrt{D^2-d^2})}$$

in which H is the hardness number; W the load in kilograms; D, the diameter of the ball in mill; and d, the diameter of the impression in the steel in millimeters. It is evident that the harder the steel the smaller will be the impression and the greater the hardness number. Brinell hardness closely measures the ultimate tensile strength.

Shore's method employing the instrument known as the scleroscope, consists of allowing a small diamond pointed weight to fall freely in a glass tube, graduated in certain arbitrary units or numbers. The weight falls from a fixed height and the rebound in the tube to a certain number or graduation measures the hardness. The harder the steel the greater is the rebound, and the greater the hardness number. The Shore method measures the elasticity and elastic limit rather than the ultimate tensile strength. If the scleroscope number be multiplied by 6, it will roughly give the Brinell number, but the hardness of the two methods is not strictly comparable as they measure different properties. The comparison of the scleroscope and Brinell hardness numbers, and the corresponding physical properties of steel are shown in Table XI. This data is presented graphically in Fig. 32.

Greatly intensified physical properties can be produced in carbon steels by the addition of certain well defined amounts of given elements. The most common of these are: Nickel,

Effect Of Elements On Physical Properties

In this, the final installment of Chapter III, the authors explain the influence of nickel, manganese, chromium, silicon, tungsten, etc., on the physical properties of steel. In Chapter IV, which will appear in full in the issue of Jan. 10, the authors discuss the general aspects of heat treating.

Chapter I of the series appeared Oct. 4; Chapter II was published in the issues of Oct. 18, Nov. 1 and Nov. 15; and Chapter III appeared in the Nov. 29, Dec. 13 and the current issue.

Charles H. Fulton is director of school of mines and metallurgy, University of Missouri; Hugh M. Henton is consulting metallurgical engineer and assistant professor of metallurgy and mining, State College of Washington, and James H. Knapp is furnace engineer, Tate-Jones & Co., Pittsburgh.

manganese, vanadium, chromium, silicon and tungsten or molybdenum. For the pure iron carbon steels it has been stated that the physical properties are largely dependent upon the individual physical properties of the constituents, that is, ferrite, pearlite, the carbon martensite, etc.

Influence of Nickel

If an element like nickel is added to a carbon steel, the nickel combines with the iron or ferrite resulting in a solid solution of iron and nickel, which is a different thing than ferrite and hence may be expected to have different physical properties. A slowly cooled nickel steel will consist of excess solid solution, nickel ferrite, and pearlite, made up of the usual cementite and nickel ferrite solid solution. The effect of nickel on iron is to increase the elastic limit, tensile strength, and reduction of area, but to decrease the elongation. The average effect of nickel up to 8 per cent on a carbon steel (Abbott) is as follows:

0.01 per cent nickel increases the elastic limit 40 pounds per square inch; increases the tensile strength 42 pounds per square inch; 0.01 per cent nickel increases the reduction of area 0.005 per cent; and decreases the elongation 0.01 per cent.

Thus a 3.5 per cent nickel steel, the most common commercial alloy, should have 14,000 pounds higher elastic limit, 14,700 pounds higher tensile strength, 1.5 per cent greater reduction in area and a 3.5 per cent less elongation, than a steel of the same analysis but without the nickel.

The addition of nickel lowers the critical points of the iron-carbon steels considerably. Fig. 33 is a diagram illustrating the critical range of the iron-carbon steels of below 0.9 per cent, an enlargement of the left of the iron carbon diagram shown in Chapter 1.* The line *GOS* represents the upper critical point Ac_3, the line *MO*, the critical point Ac_2 and the line *PS*, the calescence point Ac_1. These points are lowered by the addition of nickel as follows:

0.01 per cent nickel lowers:

	Degrees Fahr.	Degrees Cent.
GO about	0.423	0.235
OS about	0.324	0.180
MO about	0.517	0.087
PS about	0.185	0.103

It is evident that the addition of sufficient nickel will lower A_3 to room temperature or below it, so that even slow air cooling of such an alloy will cause it to stay in the austenitic state at room temperature. It is evident from the above that the heat treatment region of a nickel steel lies lower than that for ordinary carbon steels and the temperature conditions for the production of the various constituents must be regulated accordingly. It also is true that when nickel is present the separation of the cementite in the formation of pearlite is not as rapid or complete so that the pearlite areas are larger and not as well defined as in a slowly cooled carbon steel. This effect is more pronounced the more rapid the cooling so that as pearlite is stronger than pearlite plus excess ferrite, an air cooled nickel steel will have an even greater strength than would be expected from the increased strength figures just given, as these apply to slowly cooled steels.

A nickel steel in the martensitic state, this is, of relatively low nickel content quenched from above the line *GOS*, will have a higher elastic limit and greater tensile strength, but a slightly lower reduction and elongation than a similar steel without nickel. The increased strength, however, more than makes up for the slight loss in elongation and reduction of area.

Manganese, like nickel, forms a solid solution with iron, but unlike nickel also forms a carbide with the carbon, that is, a manganiferous cementite. The constituents of an alloy of iron, manganese and carbon in the slowly cooled state, when not too much manganese is present, therefore, are manganiferous ferrite (solid solution) and a manganese iron cementite. The properties of these constituents of course are different from the similar constituents of pure iron-carbon series. Manganese, like nickel, greatly lowers the critical points of iron, so that the typical manganese steel of about 12 per cent manganese and 1.5 per cent carbon (Hadfield's manganese steel), is in the austenitic condition at room temperature even when

Table XI

Comparing Scleroscope and Brinell Numbers and Physical Properties of Steel

Zones of Hardness F to A	Approx. Scleroscope Hardness Number	Brinell Ball Hardness Number	TENSILE STRENGTH: Yield Point, Tons per sq. in.	TENSILE STRENGTH: Yield Point, Kilograms per sq. m/m	TENSILE STRENGTH: Maximum Stress, Tons per sq. in.	TENSILE STRENGTH: Maximum Stress, Kilograms per sq. m/m	COMPRESSION (specimens .564" diameter and .70" in height): Elastic Limit and 25 Per Cent Compression, Tons per sq. in.	Elastic Limit and 25 Per Cent Compression, Kilograms per sq. m/m	Compression Per Cent (100 tons per sq. in.) (160 Kilogrammes per sq. m/m
		150	20	31	36	57	17	27	49.0
F		175	26	41	41	65	19	30	40.0
	34	200	32	50	46	72	21	32	35.0
	38	225	38	60	51	80	23	36	31.0
	42	250	44	69	56	88	26	41	27.0
E	46	275	50	79	61	96	30	47	23.0
	50	300	56	88	66	104	34	54	19.0
	54	325	61	96	71	112	38	60	15.2
	57	350	67	105	76	120	43	68	11.3
D	61	375	73	115	81	128	49	77	8.0
	64	400	79	124	86	135	55	87	5.6
	68	425	84	132	91	143	61	96	3.8
	71	450	90	142	96	151	67	105	2.4
C	75	475	96	151	101	159	74	116	1.3
	78	500	102	161	106	167	81	127	0.6
	80	525	107	169	111	175	87	137	0.23
	84	550	113	178	116	183	94	148	0.21
B	86	575			121	190	101	159	0.20
	89	600			126	198	108	170	0.18
	92	625* –					115	181	0.16
	95	650 –	Not		131	206	121	192	0.14
A	99	675 –	Determined		136	214	129	203	0.13
	101	700 –			141	222	136	214	0.12
A2 Owing to want of data, but little is known about this extremely high zone of "superhardness."		725 –	Not		Not		144	227	0.11
		750 –	Determined		Determined		151	238	0.09
		785 –					159	250	0.08
		800 –					166	261	0.07

*Glass scratching hardness commences here.
Sir Robt. Hadfield, president's address, Society British Gas Industries, 1918. Taken from Journal American Steel Treaters society, October, 1918.

*The temperature of the critical points as given in Fig. 4, Chapter I, differ somewhat from those of Fig. 33, due to the several authorities quoted.

slowly cooled. All ordinary commercial carbon steels contain manganese, usually about 0.4 to 0.55 per cent and such steels are not designated as manganese steels. The addition of manganese to carbon steel up to about 2 per cent intensifies the physical properties, increasing the tensile strength and the elastic limit, though decreasing the ductility as shown by a decrease in the elongation and reduction of area. Further addition of manganese causes a rapid deterioration of properties and at 5 to 7 per cent the material is brittle and worthless. When 11 to 12 per cent is reached, there is, however, again a decided change of properties, the tensile strength being 120,000 to 141,000 pounds per square inch, and the elongation 30 to 50 per cent, that is, a strong and ductile material.

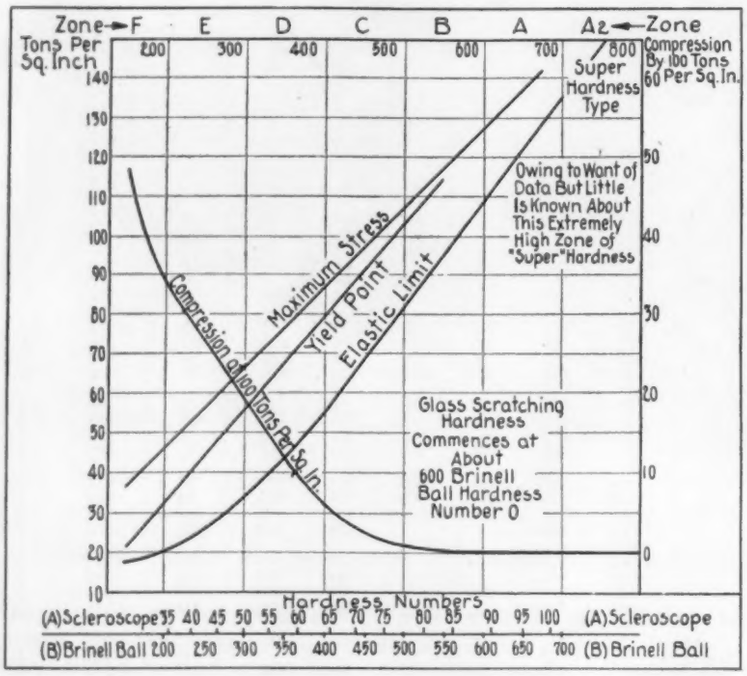

Zone F E D C B A A2 Zone
Tons Per Sq. Inch
Compression By 100 Tons Per Sq. In.
Super Hardness Type
Owing to Want of Data But Little Is Known About This Extremely High Zone of "Super" Hardness
Maximum Stress
Yield Point
Elastic Limit
Compression at 100 Tons Per Sq. In.
Glass Scratching Hardness Commences at About 600 Brinell Ball Hardness Number 0
Hardness Numbers
(A) Scleroscope
(B) Brinell Ball

FIG. 32—DIAGRAM SHOWING RELATION BETWEEN HARDNESS AND PHYSICAL PROPERTIES OF STEEL (PREPARED BY SIR ROBERT HADFIELD FROM DATA IN TABLE XI)

Manganese steels are divided into two classes, first, those containing about 1.25 to 1.75 per cent manganese and second, those containing about 12 per cent manganese. The explanation for the action of manganese in steel is to be found in the displacement of the critical points. With about 1.5 per cent manganese, the lowering of the critical points is such that as in the case of nickel, ordinary cooling will produce a generally finer structure, that is, finer excess ferrite and finer pearlite structure. In fact, it approaches sorbite with the consequent intensification of the physical properties as has been explained under nickel. However, when the manganese content reaches 5 to 7 per cent, ordinary cooling will produce not the pearlitic structure, but the martensitic structure. Now, manganiferous martensite is hard and brittle, in the same way that the high carbon martensite is brittle, except that the manganese intensifies these properties. When 12 per cent manganese is reached, ordinary cooling produces manganiferous austenite which is soft and tough; hence, the great change in physical properties between 7 and 12 per cent manganese. With the usual carbon content of 1.5 per cent in 12 per cent manganese steel, slow cooling permits the separation of cementite plates in the steel so that the slowly cooled 12 per cent manganese steel consists of manganiferous austenite and cementite plates, which structure is weak and relatively brittle. However, the rapid quenching from a temperature of about 1000 degrees Cent., suppresses the formation of cementite and the resulting steel is strong and ductile. The quenched manganese steel is soft (about 125 Brinell or that of a 0.22 per cent carbon steel in the annealed state). But the plastic deformation such as cold working, produces immediately a hard surface due to the martensitization of the austenite. The hardness of this surface may be as high as 540 Brinell. It is well known that austenitic steels may be changed into the martensitic state by plastic deformation.

Therefore in the case of 12 per cent manganese steel we have the condition of a soft, tough mass, the surface of which when used in the forms of rails or jaw plates of rock crushers, becomes surfaced with an extremely hard shell due to the deformation resulting from wear.

Influence of Vanadium

Vanadium steels are classified first into such as contain from 0.1 to 0.25 per cent vanadium and which are used for automobile parts, springs, steel castings for locomotive frames and locomotive forgings, etc., and second, those which contain from 0.25 per cent to 1 per cent and are used chiefly for cutting tools, although cutting tools at the present time also contain less than 0.25 per cent. Vanadium dissolves only to a slight extent in iron but forms a carbide with carbon so that when vanadium is added to carbon steel in small amounts, it will practically all be found in the cementite of the pearlite. Vanadium usually is used in only small quantities as already stated. With 5 per cent vanadium present, it entirely replaces all of the iron in the carbide so that only vanadium carbide and not iron-vanadium carbide is present. Vanadium iron carbide in the pearlite is not readily absorbed in heating through the critical range so that a heating to a relatively high temperature is required to put vanadium steel in the austenitic state. Vanadium has relatively little affect on the position of the critical points. Like nickel and manganese, it is said to produce a finer structure of the excess ferrite and pearlite so that on cooling, there is a tendency again to form a sorbitic structure with its consequent physical properties. Vanadium raises both the tensile strength and the elastic limit, the latter is increased more than the former. It also confers upon the steel the valuable property of being able to resist fatigue resulting from the application of rapidly repeated alternating stresses.

Chromium in Steel

Chromium is an important alloying element, and forms like manganese a solid solution with the iron or ferrite and a carbide with the carbon, so that in pearlitic chromium steels the chromium is in both the iron (chrome-

ferrite) and in the carbide, (iron-chrome cementite). Chromium is perhaps the most widely used of the alloying elements. It is used, first, as simple chrome steel containing iron, chromium and carbon (ternary steel) which may contain up to 3 per cent chromium, and up to 2 per cent carbon, and second, as the more complex alloy of iron, chromium, carbon and a fourth alloying element such as vanadium, nickel, manganese, tungsten and silicon (quaternary steels). In the last named steels the amount of chromium is less, usually not more than 1 per cent, and the carbon is also generally under 1 per cent.

The first type of chrome steel is used in the construction of safes, armor piercing projectiles, and the wearing parts of rock crushing machinery The second type is used for armor plate, projectiles, automobile parts, springs, etc. The effect of chromium on the critical points of the steel is different from that of nickel or manganese, in that the critical point depends upon the temperature from which the steel is cooled. The higher the temperature from which cooling takes place, the lower the temperature at which the critical point occurs. This behavior very much complicates the heat treatment.

With the percentage of chromium commonly used, all the chrome steels are pearlitic when slowly cooled. In quenching from above, the upper critical point the martensitic state is produced as with ordinary carbon steels. This chrome martensite combines intense hardness with a high elastic limit, so that it is tough compared to the brittle martensite of high carbon steels.

Effect of Silicon

Silicon in amounts up to 0.3 per cent is found in all commercial steels, though the amount is usually less than the upper limit given. On being added to iron silicon forms a silicide of iron, FeSi, which goes into solution in the iron. It forms no carbide but on the contrary prevents the formation of even iron carbide when present in amounts over 2.5 per cent, causing the carbon to separate out as graphite. The critical points are affected by silicon in that the A_1 point is obliterated by a sufficient amount of silicon, that is, since it destroys cementite, no pearlite can form, and the magnetic point A_2 is lowered somewhat. The A_3 point is not much affected. Silicon in small quantities increases the tensile strength and elastic limit though this effect is usually masked by the presence of carbon and manganese in the ordinary carbon steel. Silicon steels find a wide application for the purpose of electrical construction, particularly in magnetic circuits. For this purpose the silicon varies between 2 and 5 per cent. The silicon greatly influences the electrical properties of the steel, such as the magnetic hysteresis, the permeability, etc. Silicon in quantities under 1 per cent also is used in conjunction with manganese and with vanadium, for the purpose of spring steels and for certain tool and gun steels.

Tungsten is used as an alloying element chiefly in tool steels. Tungsten dissolves in iron, forming a solid solution and also forms a carbide with carbon. This carbide, or the double carbide of iron and tungsten which forms, is difficultly soluble in the tungsten ferrite above the critical temperatures, so that high heating is necessary to obtain the absorption, that is, to form the austenitic state. Again on cooling this cementite separates out so that with high tungsten steels it is not possible to obtain the pure austenitic state. The critical points of iron probably are raised by the addition of tungsten, but the most prominent effect of tungsten on the critical point is that the critical point is dependent upon the temperature from which the steel is cooled, the higher the temperature from which the steel cools, the lower is the occurrence of the critical point. In this respect tungsten is similar to chromium in effect. Hence, when a tungsten steel in heat treatment is raised to a high temperature, near its melting point, in order to cause the absorption of the cementite, in cooling from this high temperature the transformation points are obscured and lowered, so that a quenching from above this relatively low critical point leads to a stable structure, which may be austenitic, or martensitic, dependent whether the tungsten is relatively high or low. Even rapid cooling in air leads to this structure, and the production of this hard state in the tungsten steel without quenching has led to the term "self-hardening steel." Since the critical point in the steel is so low, due to the high temperature from which it was cooled, it is stable, and even a reheating well toward a dull red heat does not "draw the temper" or soften the steel, like it does in a carbon steel. The steel, therefore, is highly suitable for the purpose of cutting tools, since the heat developed by the mechanical work of cutting does not draw the temper or soften the tool. The effect of tungsten is greatly augmented by the addition of chromium and manganese.

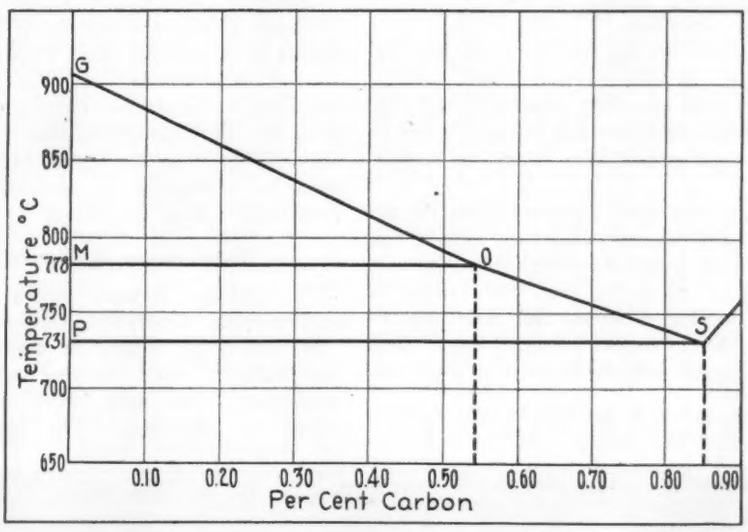


FIG. 33—CRITICAL TEMPERATURES FOR A PURE IRON-CARBON ALLOY. LINE GOS REPRESENTS UPPER CRITICAL POINTS AC_3 (R. R. ABBOTT)

As may be inferred the heat treatment of the high speed steels is complex. The composition of high speed steel varies greatly. The tungsten ranges between 3.5 and 2.4 per cent, the chromium between 0 and 6 per cent, and the carbon between 0.4 and 2 per cent. Some manganese always is present and as stated sometimes a small amount of vanadium.

Molybdenum in its action is similar to tungsten; however, it only takes about one-half the amount of molybdenum to obtain the same effect.

Baking Enamel by Electric Heat

Rochester Foundry Utilizes Electric Oven, Pyrometrically Controlled, To Bake Enamel on Stove Castings and Sheet Steel—Heating Elements Are Arranged in Simple Fashion—Close Temperature Regulation Is Obtained

BY EDWARD W. ROESER

FOR a great many years the application of vitreous enamel to iron and steel products has been accomplished through the agency of fuel-fired furnaces; using coke, coal, oil or gas as the heating medium. The practice required in this art until recently was regarded as secret, due largely to the operator's familiarity with the system of temperature control devised by himself from experience.

Electric heating for years has been regarded as too expensive and until a short time ago little experience had been accumulated concerning the uses to which nickel-chromium wire could be subjected.

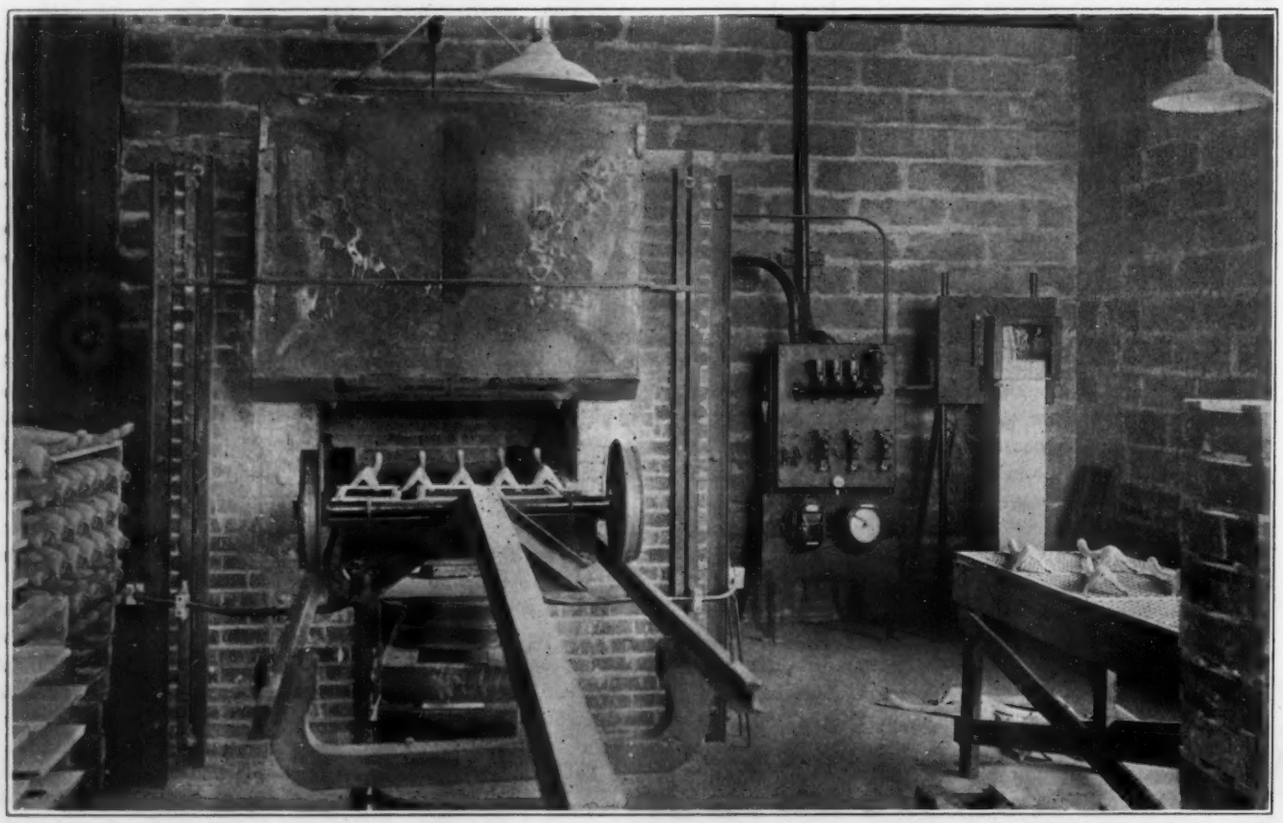
Like any new departure from the accustomed practice, the use of electric heat for high temperature work met with criticisms. Excessive cost, the failure of the heating elements, and their destruction due to impurities which might come in contact with them when at high temperature, were among those frequently mentioned. Cost in inconvenience and lack of control when having enameled work done in other plants caused the Galusha Stove Co., Rochester, N. Y., to consider installing an enameling plant of its own. Coke, coal and oil-fired furnaces received careful consideration, but the difficulty of securing accurate and comparable information caused some confusion as to the actual merits of each except in a general way. From prescribed performance data, the cost of operation of an electric furnace was estimated. The installation cost together with the inherent advantages of electric operation determined the selection of an electrically heated installation.

The author is engineer for the Rochester Gas & Electric Corp., Rochester, N. Y.

Construction Is Simple

The Galusha furnace, shown in the accompanying illustration, consists of a lower and upper rectangular chamber the side walls of each carrying refractory supporting bricks upon which nichrome ribbon is suspended. The space occupied by the heaters is in a side wall niche so as to avoid contact with incoming work. A winding has been placed on the front wall of the lower chamber to provide compensation for door losses. On each side wall in the lower chamber one-third of the capacity is distributed as a double winding. The remaining third is distributed on the side walls of the upper chamber as a single winding excepting near the charging door where the winding is doubled to assist the front lower chamber single winding in compensating for door losses. Such a disposition of heating elements enables the operator to utilize the entire depth of the furnace and further contributes to the distribution of a uniform heat throughout the working space.

The windings are rectangular in cross section and are suspended on suitable refractory brick on the side walls of the furnace. The ends are bent and drilled for terminal connection and additional nichrome wire is welded to the terminal strip which passes through a wall bush-



CASTINGS ARE PLACED ON A TRAY WHICH IS HANDLED BY A FORM SUPPORT RUNNING UPON WHEELS ALONG THE TWO RAILS SHOWN

ing and is secured in place by a set screw in a collar washer.

Products to be enameled are placed on thermoalloy triangular bars which rest on the arms of the charging fork shown in the illustration. When charging the furnace, the load is advanced in the chamber and the bars are lowered onto the projecting refractory ledge which separates the lower and upper chambers. The charging fork is then withdrawn, the door closed and the work subjected to the radiant heat of the element for the firing period. In unloading, the above operations are reversed in sequence. That the external radiation losses may not be too great, air cell insulating brick 12 inches thick surrounds the heating chamber. Such brick has little mechanical strength and is therefore re-enforced by an outside wall made up of one course of red brick. The windings are connected in delta and this network is supplied with power from the consumers service at 23 volts, 3-phase, and 60 cycle through the contactors shown at the top of the switchboard.

The control switch energizes the contactor magnet closing the circuit. At the bottom of the board three relays are located. The one at the left controls the energy supply as dictated by the automatic, temperature control, and the other two provide protection against overloads. The temperature control which was installed by Leeds & Northrup Co., Philadelphia, receives a voltage from the thermocouple inserted in the rear of the furnace chamber. This voltage creates an unbalanced condition in the galvanometer system proportional to the temperature. The galvanometer control element, through the mechanical train devised, indicates the temperature in the chamber. A dial in the rear of the instrument is so operated that when the temperature is low the closing relay at the left closes the contactors at the top of the board. When the temperature exceeds the predetermined value the opening relay, which is combined with the closing relay, operates to disconnect the contactors from the circuit. By this arrangement the temperature may be controlled within the narrow range of 5 degrees Fahr.

Results May Be Duplicated

Such accurate control makes it possible to duplicate results in such a furnace whereas some difficulty is experienced in this connection in other types. It also contributes to the economy of operation which is important when employing electric energy as a heating medium, in that the automatic control limits the power consumption to the actual production requirements of the furnace.

Furnaces now are designed which will produce 6.5 to 7 pounds of metal enameled per kilowatt-hour at a temperature of approximately 1600 degrees Fahr. An efficiency of this character is indeed inviting when electric energy can be purchased at low cost. Some furnaces have been installed where the rate per kilowatt-hour is as high as 2.5 cents. Lower rates than this are possible locally, the actual rate being dependent on the manner of use in accordance with provisions in the rate schedule. The furnace under consideration operates after the foundry load is off and in addition, during the winter months, remains off from 4 to 7 p.m. thereby earning a favorable rate.

Plan Additional Unit

When the foundry closes down the control switch is thrown in and the temperature allowed to attain its working value whereupon the control equipment disconnects the energy supply. After the furnace has been thoroughly dried out and then allowed to cool with the door open and having a temperature inside of less than 200 degrees so that a man may work in the chamber, it takes approximately four hours to attain a temperature of 1300 degrees Fahr. Normally, if the plant is shut down in the afternoon at 4 or 5 o'clock and current is turned on to the furnace in the morning at seven o'clock, about 45 minutes are required to raise the temperature from 900 degrees to 1300 degrees Fahr. These two instances are mentioned because they represent general practice at the Galusha Stove Co., depending upon the time of year.

An electric load of this type is particularly desirable for several reasons; First, it generally uses energy 24 hours per day, and when properly operated a load factor as high as 80 per cent may be obtained; second it does not require any more capacity from the central station than its connected load; in other words it is a noninducive load and therefore operates at unity power factor. This is a vital consideration in central station equipment investment.

Cast iron products are sand blasted and then cleaned by compressed air after which enamel is sprayed on them. They are then dried and fired. The temperature at which the castings are fired depends largely upon the constituent parts of the enamel used but with cast iron, temperatures from 1200 degrees to 1400 degrees Fahr. are employed. The finish is hard and glossy, being made up in a variety of colors such as white, gray, blue and black.

Steel for enameling is used in sheets and is treated in an acid bath before the enamel is applied. The enamel is flowed on the work and allowed to drip before being placed on the rack to dry. The firing is conducted in the same manner as with cast iron with the exception that the firing period is but 2 or 3 minutes and the temperature higher, somewhere around 1600 degrees Fahr.

Both recent developments and experience clearly indicate the wide application of electric heat for industrial processes. The cost of electricity as normally used has established an unwarranted fear in the minds of many that its use would be suicidal for furnace operation whereas it can be utilized to advantage in most heating operations at a cost justifying its use in competition with other fuels. It cannot be used economically unless careful technical judgment is brought to bear in design of equipment and operating knowledge to use the rate schedule advantageously is acquired by responsible employes.

Two years ago the Galusha Stove Co.'s electric enameling furnace was the second furnace in operation on a commercial scale in this country; today over 30 furnaces employing similar temperatures are in daily operation and their number is being added to at a phenomenal rate. That the furnace is giving satisfaction is more clearly emphasized by saying that plans are now under way for the installation of an additional unit, having a capacity of 95 kilowatts. This new unit will be operated 24 hours per day to obtain the advantage of a lower rate schedule.

Another plant having had experience of 1½ years with six electric furnaces has completed its plans for the installation of six additional furnaces each having a rated capacity of 60 kilowatts.

Will Standardize Bolt, Nut and Rivet Sizes

The personnel of the committee which is developing standards for bolt, nut and rivet proportions under the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers has just been approved by the American Engineering standards committee. A. E. Norton, professor of mechanical engineering, Harvard university, is chairman of the committee and W. J. Outcalt, standards department, General Motors Corp., Detroit, is secretary. The working committee, which has 43 members, 17 of whom represent producers, 24 consumers, and two general interests, is subdivided into eight subcommittees dealing with the following specific subjects: Large and small rivets; wrench head bolts and nuts; slotted head products; track bolts and nuts; carriage bolts; special bolts and nuts for agricultural machinery; body dimensions and material to be used and nomenclature.

This project originated in a proposal to standardize the widths across flats on nuts and bolt heads, to reduce the number of wrenches required to handle the numerous bolts and nuts on machinery and tools. Frequently two bolts of the same size have different nuts or heads so as to require different wrenches according to the inclinations of individual manufacturers. This causes inconvenience and expense to the user. Twenty trade and technical organizations are represented and in addition to several manufacturers of bolts, nuts, rivets, wrenches and machine screws, seven independent experts are serving on the committee.

The scope of the work now includes standardization of dimensions, material and nomenclature of all rivets, bolts, nuts and screws except wood screws, excluding, however, standardization of thread forms, this latter being covered by work of the National screw thread commission. The part of the work nearest completion is that of the subcommittee on carriage bolts, which has issued a report approved by the sectional committee and now before the sponsors. The report of the subcommittee on wrench head bolts and nuts has been formulated and is now being circulated generally for the criticism of industry as a whole.

Making Black Heart Malleable Abroad

BY R. GAILLY

I AM happy that the opportunity is given me to thank the producers of malleable of the United States, because it is due to them that we have been able to build up in our foundry the manufacture of the American malleable iron. President Ramas, and Mr. Remy, who, like myself, had the pleasure of spending some time in the United States, also have been impressed by the hospitable welcome always extended by their American colleagues to the French and Belgian foundrymen. The welcome for these two gentlemen easily is understood, for their competence and high positions make them worthy of it. As far as I am concerned the only title I had was that of being a Frenchman, but over there that is sufficient for all the doors to open before you. The list of those I would like to thank would be too long; however, I wish to make an exception for Professor Touceda, consulting engineer of the American Malleable Castings association, because he is the one who has guided me in my study, and who, in introducing me to his friends, gave me the opportunity to know many American malleable iron foundrymen.

In going to the United States my first aim was to see if American malleable is really much superior to the French malleable, as it was said to be. This part of my study did not require long, because, after my first visit I was able to satisfy myself of this superiority and concluded that it would be of benefit to produce the same metal in France.

What then are the differences between the two malleables? The American malleable permits obtaining in sections of all dimensions, homogeneous metal, as well annealed inside as outside, and easily worked. We have cast pieces 4 inches in diameter, and the metal could be worked easily; whereas with the European malleable it is difficult to anneal thoroughly a piece of more than 4/10 of an inch thick. This comes from the essential difference in the annealing processes. American malleable iron is not decarbonized during the anneal but the combined carbon is changed into free or temper carbon. To anneal European malleable it is necessary to decarbonize the castings, otherwise the metal will not have sufficient strength. For pieces of large section, the decarbonization would have to be continued for hundreds of hours to reach the heart of the metal, and this could only be done by strongly oxidizing the surface.

The American malleable, composed solely of ferrite and graphite, is naturally highly malleable, whereas the presence of pearlite in the European casting considerably reduces its malleability. However, pieces of European malleable, ⅛ to ⅜ inch thick, which can be almost entirely decarbonized, give results comparable to those of American pieces of the same section.

The method which I have adopted to verify the malleability of the metal is the Walker drop test. In this test a weight giving a 70-foot pound blow is dropped repeatedly on a wedge-shaped test piece, curling it up and breaking or cracking it. The test specimen is 6 inches long and 1 inch wide. At the bottom it is ½-inch thick and tapers off to 1/16-inch at the point. The number of blows required to crack or break the test specimen gives a fairly accurate indication of the malleability of the metal. We obtained an average of 4 to 5 blows on cupola metal, a few specimens withstanding 7 or 8 blows. Air furnace iron which we tested usually withstood 15 to 20 blows, certain specimens standing as high as 30 blows without breaking. This test, if it has the fault of not being rigorously accurate at least has the advantage of not requiring an expensive testing machine.

American requirements for the tensile test are a strength of 50,000 pounds per square inch and an elongation of 10 per cent in 2 inches. The test section of the bar is ⅝-inch in diameter and 2½ inches long. We have succeeded in making an iron giving a higher tensile strength and a greater elongation than required by the specifications. The machining tests which we have made confirm the speeds used in the United States. The turnings of this malleable are similar to turnings from steel.

The American malleable is more easily affected by heat than European malleable. For instance, any piece which has been welded must be reannealed, as a hard spot will be formed at the point of welding. Also, the grinding wheels must never be allowed to become dirty, as this would cause unevenness in the surface of the place of contact.

After having verified the qualities of the American malleable I have studied the different processes used in the United States. The air furnace is employed in about 90 per cent of the foundries. The triplex process is used in at least two or three large plants, and the open-hearth furnace in two or three shops.

Secures Information

MANY American foundrymen who met Mr. Gailly during his visit to this country about a year ago, attending the Rochester convention of the American Foundrymen's association, will be interested to learn of the application he has made of the knowledge of black heart malleable iron which he gained in this country. The American Malleable Castings association has done a great work in raising the standard of malleable iron in United States, and it is highly fitting that this association should assist the progressive foundrymen of other countries in producing a better product.

Translated from a paper presented at the International Foundrymen's congress held in Paris, France, Sept. 12 to 15.

The cupola only is used in some foundries for special manufacturing, as for instance for pipe fittings. Its use is prohibited for the manufacture of automobile and agricultural machinery castings. The high carbon in cupola casting produces a metal with low elongation, also it is impossible to avoid a precipitation of primary carbon in the thick sections. The metal being in contact with the fuel becomes laden with impurities, and it is practically impossible to obtain metal of constant analysis during the heat.

The open-hearth furnace is attractive on first consideration, because a greater proportion of the heat produced is used than is used in the air furnace, but it must be operated continuously, which necessitates a large production. It, therefore, is not adaptable to French requirements, at least not at present. The triplex process presents the same hinderance. As regards the electric furnace alone, it only can be used in regions where there are water falls, and even there I doubt whether it would be sufficiently economical; the wear of the electrodes and the refractory brick increasing the melting cost.

Melting in the cupola and partial refining in the converter is not used in the United States, because the converter is a crude instrument. The operation is too rapid to permit control of the additions before tapping. Therefore, it is impossible to obtain comparable results from different heats.

The air furnace process seems to be the only practical one in France, and the two American firms making malleable in France use it. The efficiency of this method is low since only one-tenth of the heat produced is utilized. It also presents the difficulty of considerable wear of the refractory brick. The production cost, therefore, is higher with the air furnace than the cupola.

To melt economically two heats must be made per day, that is, at least 20 tons, as the Americans have progressively abandoned the 5-ton furnace, the standard size being 10 to 15 tons. The advantage of this furnace is that uniform metal can be obtained of the desired composition since additions can be made before tapping, the same as with the electric furnace.

To closely control the metal, a laboratory must be available for the analysis of the iron. The analysis of the hard iron varies in different foundries within the following limits:

	Per cent
Carbon	2.10 to 2.50
Silicon	0.70 to 0.95
Manganese	0.25 to 0.30
Sulphur	0.07 to 0.10
Phosphorus	0.15 to 0.20

These limits are not absolute as one often finds castings having only 0.60 to 0.65 per cent silicon, or 0.20 to 0.25 per cent manganese.

The average loss during melting has been indicated by H. A. Schwartz, manager of research, the National Malleable Castings Co., in his remarkable work, *American Malleable Cast Iron.* This is given as:

	Per cent
Carbon	0.62
Silicon	0.33
Manganese	0.26
Phosphorus	0.00
Iron	1.14
Sulphur—gain	0.01

By these figures it can be seen that the iron to be used must contain high carbon, about 4 to 4.10 per cent. This carbon content, common in the United States, is difficult to obtain in France, but it is secured easily in England, and especially in Sweden. Besides, the latter irons have the advantage of low sulphur. This influences the anneal, but the research on that subject is too recent to enable a clear explanation of this action to be given.

The annealing oven can be heated by different fuels. Oil is little used in the United States, where it is, however, comparatively cheap. Pulverized coal is considered to be an economical fuel when the production of the plant is sufficiently large to warrant the expenditure for the necessary equipment. For smaller production the individual apparatus might be used, but I do not believe that it is in use in the United States.

Coal, fed by hand, is the fuel mostly employed. The coal has a high percentage of volatile matter, 35 to 40 per cent, 5 to 6 per cent ash, and 1 to 2 per cent moisture. Fireclay brick containing 35 to 40 per cent alumina are used. However, any brick which will stand up under a temperature of 1600 degrees Cent. may be suitable.

No oxidizing agent is required in annealing American malleable, but it is necessary to pack the pieces to avoid deformation. For that purpose ore, mill scale, or crushed slag is used. The composition of this packing varies in different foundries, but this is not of great importance.

The annealing temperature varies from 815 to 900 degrees Cent. However, in producing American malleable we have found that it is preferable to anneal at a higher temperature, which varies, according to the composition of the metal, up to about 950 degrees Cent. This is due probably to the higher sulphur contents of our iron. The castings are held at the annealing temperature for 60 to 70 hours, although certain mills anneal a shorter time.

I regret not to have been able to present you a more interesting communication from the technical point of view, but we only have been reproducing in France what exists in the United States and, therefore, have found nothing new. Besides, our research facilities are far from as complete as those of the Americans, who have at their disposal wonderfully equipped laboratories.

Will Investigate Nickel Plating of Steel

With a view to finding the best possible process for making protective coatings on steel, the bureau of standards, Washington, has initiated a program of nickel plating experiments. Many specimens are to be plated and the procedure will be varied from the standard conditions in many ways to test the effect of these variations on the product. After plating the specimens will be subjected to tests to determine their resistance to corrosion and to other adverse conditions that nickel plated ware is expected to meet. Several other tests will be made with nickel plating on brass and other metals to learn to what extent the results found for steel are generally applicable to other metals. From six months to a year will be required for the tests. The program is being carried out in co-operation with the advisory committee of the American Electroplaters society.

Cold rolled steel is to be used for all of the tests. In addition, the normal procedure will be tried on a few specimens of brass. The normal procedure consists in the electrolytic cleaning of the steel and then plating it in a solution of nickel sulphate of 140 grams per liter, 13.5 grams of ammonium chloride and 15.5 grams of boric acid, the solution having a hydrogen ion concentration of 5.8. Commercial anodes of 97 per cent will be used, the temperature will be 70 degrees Fahr. and the current density 5 amperes per square foot. The specimen will be plated for an hour, resulting in a coating 0.00025-inch thick. One side will be buffed.

Variations in preparation will be tried, such as cleaning in hot alkali, sand blasting, etc., preliminary plating with copper, zinc and cadmium will be tested and many variations in the nickel plating process itself will be experimented with, such as changing the temperature, current density, composition of solution, etc. Different kinds of anodes also will be tried. When completed, the deposits will be examined both directly and under the microscope. They will be tested for hardness, for their adhesion to the steel under such adverse conditions as bending, rolling, etc., and for the resistance they offer to corrosion under various conditions of exposure, both indoor and outdoor.

Study of Metals by X-Ray in Its Infancy

At a meeting of the Birmingham Metallurgical society at Birmingham, England, recently Sir W. H. Bragg, a leading British authority on X-ray examination of metals, read a paper on the subject of X-ray examination. Sir William said that the practice of analyzing metals by means of X-rays is only in its infancy. There is every reason to believe, he declared, that soon great advances will be made in determining the crystallization and therefore the properties of metals. Students of metallurgy are well aware that the properties of metals and other bodies depend on the nature of their crystallization. The microscope has rendered valuable service largely because it enables the form and arrangement of the crystalline grains to be studied. The X-ray carries the same form of inquiry into a region 10,000 times more minute, thereby furnishing new evidence as to crystalline structures, so that it is now possible to see the atoms and the molecules, and the way they form crystals.

This evidence is furnished in various ways. Every crystal has its characteristic X-ray spectrum and can be identified thereby even when the individual crystals are beyond the resolving power of the microscope and the substance is in danger of being called amorphous. If a specimen contains a mixture of crystalline substances, the spectrum shows the combined effect of all the substances, and provided each individual spectrum is known, the specimen can be analyzed. But the X-ray analysis is different from the ordinary procedure, inasmuch as a chemical analysis first pulls the specimen to pieces and then determines the elments present with their relative proportion, the X-ray analysis leaves the structure intact and determines what crystals are contained in it, or in other words, determines the nature of the combinations formed by the atoms. Its limitation consists in the fact that it does not give accurate information as to the relative proportions of the crystals.

Crystallization of metals really presents no more difficulties than other substances, said Sir William, though they appear more difficult because of the questions asked on a subject of practical importance. Useful work has already been done. The crystalline form of each metal is comparatively easy to determine. The more interesting questions relate to the structure of alloys and to problems of stress. Westgren and others have examined the various forms of iron and have given good reason for supposing that the carbon atoms are thrust into the interstices of the regular lattice in which the iron atoms are arranged. Owen and Preston working in conjunction with Rosenhain have shown that in the copper-aluminum alloy, as well as other alloys of two metals, the one metal may replace the other in the structure, and Rosenhain has based a theory of hardening on their results.

It is impossible to prophesy the extent to which X-rays will be used in the future, but a great advance in research is inevitable. It is a question whether in place of the ordinary classification of gases, liquids, and solids one ought not to substitute that of gases, liquids, and crystals, because there are crystals even in cotton and such things. Nature always seems to be trying to arrange substances symetrically. The X-rays pass through thousands of layers before they are absorbed. The operation of the new methods of analysis is extraordinarily simple. Every crystal in the world has its own arrangement, but there is an infinite variation certainly running into hundreds of thousands. Eventually, no doubt, each variation will be ticketed and numbered.

Melting Sponge Iron in Electric Furnace

Experimental work on the production of foundry iron from sponge iron in the electric furnace, performed at the Seattle station of the bureau of mines, demonstrated that technically, at least, the process is a success, though large scale tests are necessary to determine its commercial applicability. Such a process would find application in melting iron in regions remote from blast furnaces, or where establishment of blast furnaces would be impracticable. Sponge iron was melted in batch runs and continuous runs in various types of furnaces, and under both acid and basic conditions.

The type of furnace found best fitted for the continuous melting of sponge iron is a deep pit furnace with a single electrode and a conducting hearth. The main problems solved were: High recovery of iron, clean separation of the slag, obtaining metal of a high carbon content, introduction to the metal of silicon and manganese from the slag to eliminate the necessity of using ferro-alloys, and, finally, the removal of sulphur. To produce the best quality of gray iron, an auxiliary furnace would be necessary to adjust the final composition of the metal.

Will Call Conference on Cast Iron Pipe

At a recent meeting of a special committee of the American Engineering Standards committee at which standard specifications for cast iron pipe were discussed this committee recommended "that the American Engineering Standards committee call a representative conference on bell and spigot and flanged cast iron pipe and fittings to consider the development of specifications covering dimensions and materials." This action resulted from a review of two sets of specifications for cast iron pipe submitted for the approval of the committee, one set by the American Gas association and the other by the American Society for Testing Materials.

The American Gas association submitted three specifications: Cast iron pipe and special castings; bell and spigot pipe and special castings; and flanged pipe and special castings. These were in course of development in 1911 as American Gas institute specifications, which in turn were derived in part from old standards of the American Gas Light association and the Society of Gas Lighting. All have been revised to 1922.

The American Society for Testing Materials also submitted for approval, specifications *A* 44-04 for cast iron pipe and special castings, suggesting at the same time that the whole question of specifications for cast iron pipe, covering all of its uses, should be considered. These specifications were developed under committee *A*-3 on cast iron and grew out of extensive discussion between waterworks engineers and manufacturers of cast iron pipe, subsequent to the adoption of specifications by the New England Water Works association. These standards were adopted in 1904 and in 1908 were utilized in the specifications of the American Water Works association.

When the two sets of specifications were examined, it was found that neither seemed to satisfy completely the needs of all interests concerned in the establishment of such standards. As a result of the committee's recommendation, the chairman of the American Engineering Standards committee was authorized to call the conference as outlined. It was understood that the conference would to some extent consider soil pipe and other light uses of cast iron pipe. This conference will be asked to determine : (1) Whether the work shall be undertaken; (2) if so, what its scope shall be; (3) how the work shall be organized; and how it is to be related to any other activities having an important bearing on it.

Apprentice Training Makes Rapid Progress

Washington, Dec. 24.—An encyclopedia of information on the subject of apprenticeship in the United States now is available in the Bulletin on Apprentice Education which has just been issued by the federal board for vocational education.

New methods of apprentice training have been made necessary by the introduction of large scale production in industry, the bulletin shows. During the last 15 years, the class room method of apprentice education has been developed to supplement job experience. Such education has been given given either in the form of vocational training in the public schools, or through corporation schools under the auspices of employers, or through classes controlled by the trade unions.

The most surprising progress has been made along the lines of part-time apprentice training classes organized by the public schools, according to the bulletin. Such training dates from the passage of the federal vocational education act in 1917. At the close of the fiscal year 1921-22, a total of 265,494 pupils were enrolled in such continuation classes. The bulletin believes that the public school is destined to fill a role of increasing importance in apprentice education, since it supplies a neutral agency, acceptable to both capital and labor.

Sharp issue is taken with the belief of many educators that the part time school is only a temporary makeshift to be displaced as soon as the age of comulsory full time education can be raised to a desired point. The bulletin questions the wisdom of full time education for boys and girls over 14, whose minds are set on employment. For such youths, industrial experience will prove of greater educational value than unwilling attendance at high schools, it is declared. At the same time, the part time school holds these young workers within the influence of the public school system.

Part time vocational education bridges the gap between the job and the school, and enables the child to gain the cultural benefits of both, during his formative years, declares the bulletin. The increasing use of the public school for apprentice training by both employers and trade unions will be a mighty stimulus to the growth of part time education, it asserts. All the same time, it will give a new practical value to the public school.

A petition in bankruptcy against the Union Drop Forge Co., Chicago, has been filed in the United States district court by the American Surety Co., New York. Frank W. Graves and the Chamberlin-Roome Steel Co. Drop Forge liabilities are set at $1,100,000 and assets at $1,000,000.

Case Plow Has Loss

The J. I. Case Plow Works, Co., Racine, Wis., for the year ended Sept. 30, 1923, shows a net loss of $1,273,054 after interest, depreciation and taxes, against a net loss of $1,340,648 in the preceding year. Net sales amounted to $1,849,806 in contrast with $1,531,840 last year. The company's balance sheet shows cash at $255,712, marketable securities of $11,589, notes and accounts receivable $14,809, notes payable $6,600,724, accounts payable $286,429 and profit and loss deficit of $5,744,299.

Plan Increased Output

United Steel Co., Lowell, Mass., has increased its capital stock from $150,000 to $500,000 to provide for increased production facilities, according to C. J. Witney, president of the company. Expansion plans include the installation of oil heated open-hearth furnaces, the first unit to be erected immediately. An electric furnace will be installed later. The plant has been in operation about three months.

Ore Resources Large

London, Dec. 13.—The investigation of iron ore resources in Lapland which was ordered by the Swedish government in 1913, has just been concluded. A much larger quantity of ore has been discovered than was indicated by previous examinations. It now is estimated that 1,500,000,000 tons of high-grade ore are available. Over 2000 samples have been tested for iron, sulphur and phosphorus. Large quantities of the ore are said to be practically without phosphorus and it is anticipated that considerable tonnages similar in all respects to other high-grade Swedish ores will soon be released for export purposes.

Convention Calendar

Jan. 10-11—Federated American Engineering societies. Annual meeting at Washington. L. W. Wallace, 719 Fifteenth street N. W., Washington, is secretary.

Jan. 18—American Society of Safety Engineers. Annual meeting in New York.

Jan. 22-25—Society of Automotive Engineers. Annual meeting, General Motors building, Detroit.

Jan. 31-Feb. 1—American Society for Steel Treating. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

Shippers Preparing for Busy Season

Freight movements from the Great Lakes district will be equal to, if not greater, during the first two months of 1924 than they have been during the average 60 day period of the current year, 15 commodity committee chairman reported at the meeting of the Great Lakes shippers' advisory board meeting last week in Cleveland.

Railroad executives were advised to prepare to handle large movements of freight from all main production lines centered around the Great Lakes. It was generally agreed that the carriers are now in a position to give prompt service and an ample supply of cars, based on the roads' performance during the last six months when they are said to have handled peak loads without difficulty or delay.

Steps are to be taken immediately to arrange for all cars which commodity surveys show will be required during the first 60 days of 1924. Railroads were supplied with a list of probable requirements for every major plant in Ohio and neighboring states.

The automobile industry, as represented by plants in this district, will require 26,000 freight cars during January and 30,000 during February, according to K. A. Moore, National Automobile association, Detroit. He stated the industry the country ever will ship as many trucks and cars during 1924 as in 923.

C. H. Andrus, Otis Steel Co., Cleveland, said no definite predictions could be made now as to the iron and steel industry, but that present indications are that producers will have at least a normal year in 1924. He looks for a marked increase in foreign demand.

Developing Missouri Ore

St. Louis, Mo., Dec. 24.—Announcement has been made of the sale of 11,000 acres of land in the Iron Mountains in Wayne county, Mo., the consideration being $800,000. H. E. Springer and I. W. Rodgers, of Poplar Bluff, Mo. were the purchasers, and they will use the land for iron mining. Attempts to develop iron ore properties in southeast Missouri have been resumed recently after a lapse of more than a quarter of a century.

The Simonds Mfg. Co., of Fitchburg, Mass., has been dissolved by decree in superior court. The company petitioned the court for dissolution as a result of the purchase of interests of stockholders by the Simonds Saw & Steel Co. of Fitchburg. There were no assets or liabilities in the company.

Court Gives Guide

All Manufacturers' Associations May Follow to Conform to Law

Washington, Dec. 24.—The recent decree of Judge Knox in the United States district court at New York, dissolving the Cement Manufacturers' Protective association, tends to clarify matters in regard to activities of trade associations, according to a statement by Attorney General Daugherty. The cement case decree, he stated, will serve as a principle by which trade associations and their members must be governed.

The cement case has been the subject of a hard-fought contest for more than two years. The dissolution decree holds that the association was in restraint of trade and a violation of the Sherman anti-trust act. The decree, among other things, sets forth the following alleged practices held objectionable:

Reports by members to the association or other collective agency giving details of specific job contracts, showing names of dealer, contractor, description of work, quantity sold, the price, quantity delivered to date and balance to be shipped.

Reports by members to the association of changes in specific job contracts, increases, decreases and cancellations of quantities previously reported.

Daily reports by the association to its members summarizing the details of all specific job contracts filed with all members.

Reports by members requesting further information about contracts taken by other members.

Reports by checkers or inspectors giving the results of investigations of contracts about which information is desired.

Reports by the association to its members submitting checkers' reports on contracts under investigation.

Reports by members expressing satisfaction with checkers' reports or requesting further investigation and pointing out possible discrepancies.

The defendant cement corporations also are collectively and individually enjoined from agreeing among themselves or with other manufacturers of cement to do any of the following acts:

To establish uniform mill base prices for their product.

To establish arbitrary freight basing points other than the points from which shipments are actually made.

To sell their product f.o.b. point of delivery exclusively

To establish uniform charges for bags, or uniform credits for bags returned in good condition.

To establish a uniform rate of discount or uniform terms for payment of bills within a specified period.

To limit the quantity of cement to be shipped to a dealer within a specified period of time.

To prohibit the diversion or so-called misuse of cement sold on specific job contracts.

To establish and maintain a uniform differential in the price of cement sold to dealers and contractors.

To fix or suggest the amount of commission or profit dealers should be required to make in sales of cement.

To regulate or limit the amount of production of cement, or the amount of stock to be kept on hand.

To limit the time within which quotations on cement must be accepted and deliveries made, and to refuse to grant extensions in time of deliveries.

To make changes in prices effective as of the date quotations are written, to avoid "price tipping."

To guarantee prices against decline.

To make uniform charges for bin tests, or to require the purchaser to pay for such tests.

Buy Chrome Ore Deposits

New York, Dec. 24.—The Dominion Metallurgical Co., Ltd., recently completed the purchase of important chrome ore and other mineral deposits in Africa and elsewhere in the British colonies, according to announcement by Leighton McCarthy, Toronto. This company is affiliated with the Electro-Metallurgical Co. of Canada, Ltd., Welland, Ont., which is owned by the American company of the same name. The same interests controlling the Dominion Mines & Quarries Ltd., own several chrome deposits in Quebec and operate large quarries at Killarey and East Neebish. Extensive exploration work is being conducted in Canada and elsewhere.

Aids Children's Home

The United States Steel Corp. has donated $100,000 to the Catholic diocese of Erie, Pa., for use in the completion of a home for children now under construction there, according to an announcement by the Right Rev. J. M. Gannon, Bishop of Erie. The appropriation was made by the finance committee of the Steel corporation on the recommendation of Elbert H. Gary, and Bishop Gannon said that the gift came unsolicited. The money will be used specifically to further the construction of a hospital for crippled children.

Employes Given Bonus

Employes of the L. S. Starrett Co., Athol, Mass., have been granted a bonus. This is the first one in several years. To those employes who have been with the firm five years or more a 10 per cent bonus was granted; to those employed three years and less than five years, 8 per cent; over one year and less than three years 6 per cent, and one year or less 4 per cent.

Americans Now Can Bid on Needs in India

Washington, Dec. 24.—American manufacturers now have opportunity to participate actively in the Indian markets which furnish supplies directly to the Indian government, as British government authorities for the first time have opened the door for American bids on public contracts.

All purchases formerly made by the government of India were handled through the stores department in London and usually were placed with British manufacturers. In the last few years the government of India adopted the policy of making purchases in such a way as to encourage the industries of the country as far as consistent with economy and best interests, according to information received by the United States department of commerce. The stores department, recently instituted under supervision of the industries department of India, is intended to serve as mediator between purchasing officers and manufacturers, furnishing information regarding the requirements of one and the capabilities of the other.

Any American concern, says the department of commerce, desiring to bid on requisitions for the Indian stores department, for firms which are executing contracts for the government of India, or for the provinces, will find it necessary to take measures to be placed upon the approved list. The American commercial attache in London will, upon request, obtain specifications and afford assistance in making bids.

Brazilian Market Quiet

Washington, Dec. 24.—While demand for building materials in Brazil, South America, has been good in the last month, the general demand for iron and steel products was less active, and wire products were sold in small quantities with most of the imports coming from the United States, according to cabled information to the department of commerce from Trade Commissioner B. H. Noll. The prices of Belgian wire were much lower than the American product. Buying for immediate needs only characterizes the Brazilian hardware market. The electrical goods market is exceedingly quiet, with the Germans strongly active with quotations in milreis. Sales of automobiles are somewhat reduced owing to the approach of the new year.

Duffin Iron Co., Chicago, has increased its capital from $25,000 to 5000 shares no par value stock.

Employment Holding Up in Basic Industries

Washington, Dec. 24.—Increases in employment during November were over 2 per cent in only four industries, agricultural implements, automobile tires, boots and shoes, and meat packing. This is shown in the preliminary figures on volume of employment from 7430 representative establishments in 51 manufacturing industries, compiled by the United States department of labor. There was a decrease from October of five-tenths per cent in the number of employes, a decrease of 1.4 per cent in payroll totals and a decrease of nine-tenths per cent in average weekly earnings. The 51 industries taken into consideration covered 2,483,431 employes whose total earnings during one week in November were $66,503,144. The same establishments in October reported 2,496,724 employes and total payrolls of $67,451,442.

An unweighted index of the number of employes reported in the last six months is as follows: June, 100; July, 98.2; August, 98; September, 98; October, 97.8 and November, 97.3.

Seventeen of the 51 industries show increased per capita earnings of employes in November over the preceding month as compared with 42 in October, 39 in September, 25 in August, 10 in July, 23 in June, and 36 in May.

In November, 112 increases in wages were reported and 32 decreases, 13 of the decreases being in the iron and steel industry.

Pension Plan Adopted by British Empire Corp.

Washington, Dec. 24.—Formation of a pension fund for the employes of the British Empire Steel Corp. has been announced by the president of the corporation, according to information received by the department of commerce from Charles M. Freeman, American consul at Sydney, N. S. The amount of pensions payable monthly to persons retired under provisions of the fund will be at the rate of 1 per cent of the average monthly pay received by them during the last 10 years of their service, multiplied by the number of years of their entire service.

The pension plan provides for a pension payable to any male employe who has been 25 years in the service and has reached the age of 65 or more and who is retired from service either at his own request or the request of his employing officer. Benefits of the pension plan are received by female employes who have been 25 years in the service and have reached the age of 55 or more and who are retiring from service at their own request or that of employing officials.

Furthermore, any employe who has been 15 years in the service and who during the course of his employment has become permanently and totally incapacitated for further service, also shares in the pension. The board of directors of the corporation may direct the pension committee, at its discretion, to include in the pension plan, employes whose length of service has not reached the limits provided for under the terms of the pension fund, or employes who may be ineligible for other reasons for pensions under the regulations.

An employe who has been in the service of the company 30 years and during the last 10 years has received $1000 annually, or $83.33 monthly, will get a monthly pension of 1 per cent of $83.33, or 83 cents multiplied by 30. This is provided, however, that no pension shall be more than $25 a month.

This plan differs from those of most corporations as no contributions from the wages of the employes are asked. The aim of the concern is to provide a settled income for those who have grown old in the service of the company, and it is believed the plan should remove a source of discontent, particularly as affecting the miners, among whom the question of pensons long has been agitated. The pension plan is effective as of Dec. 3 and will be administered by a pension committee appointed by the board of directors.

Nearly All British Export Prices Lower

London, Dec. 19.—According to quotations complied from customs manifests by the board of trade for October, British export prices show a slight decrease compared with the previous month, with the exception of galvanized sheets and tin plate. The prices for these were lower in September but have now recovered and in the case of tin plate the present price of £24 10s per ton is the highest this year. The average British export prices for October are as follows:

	£	s	d	
Foundry pig iron	5	2	9	$22.00
Ferromanganese	15	6	0	66.00
Carbon billets	10	11	7	45.50
Beams	10	12	0	45.55
Plates	11	14	0	50.50
Galvanized sheets	20	16	0	90.00
Tin plates	24	10	0	105.50

Cast Pipe Production Gains in October

Washington, Dec. 24.—Production of cast iron pipe in October totaling 88,696 tons was the highest month on record since the department of commerce started compiling these figures in June. Shipments also increased, although below those of June. Although orders from stock increased, orders for pipe specified to be made decreased to 119,947 tons, the lowest figure recorded, and considerably below that of September when specifications totaled 156,585 tons. The summary for the five months for which cast iron pipe figures have been compiled is as follows:

	Produced tons	Shipped tons	Orders from stock tons	Orders from specifications tons
June	81,208	88,318	17,905	199,271
July	79,528	77,828	16,839	183,130
August	84,588	84,843	14,727	165,518
September	77,186	78,101	14,215	156,585
October	88,696	88,000	17,431	119,947

Ship More Locomotives

Washington, Dec. 24.—Reports from individual locomotive plants to the department of commerce show that November shipments from the principal manufacturing establishments totaled 270 for domestic account, a drop of 25 from the total of 295 in October. Foreign shipments totaled 29, a gain of 14 over the preceding month. Domestic unfilled orders dropped by 259, with a November total of 656, as compared with 915 in October. Unfilled orders for foreign account dropped from 62 in October to 35 in November.

Domestic shipments of engines in the 11 months of this year show a decided increase as compared with the corresponding period in 1922. The 1923 domestic total for the 11 months was 2680, as compared with 862 in the 11-month period in 1922. Foreign shipments this year were 180 in the 11 months, as compared with 202 in the corresponding period last year.

Steel Payrolls Larger

Washington, Dec. 18.—A increase in the average wage paid in the iron and steel industry is reported for November. The figure for the month, representing 190 establishments, is $133, as compared with $128 for October. The total number employed by 190 companies in November was 241,478. In October 186 companies reported employing 242,171.

E. L. Essley Machinery Co., Chicago, has decreased its capital stock from $400,000 to $50,000.

Dealers Expect Better Business

Machinery Sellers Anticipate Steady Increase in Volume of Sales in 1924— Heavy Automobile Production Schedules Point to Greater Tool Needs— Crane Buyers Planning for Spring

PROSPECTS for a good year in the machine tool and shop equipment market are bright according to men of the industry. With automotive manufacturers planning heavy production schedules, a demand similar to that realized during the past year should be realized. The railroads have set a record for freight handled during the year, and anticipate another heavy year to follow. Expensive repair work will be necessary under these conditions, and railroad shops should require considerable in the way of machinery and equipment during the year. Other industries anticipate a good year, and this condition should be reflected in machine tools.

The past week has been quiet, due to the holidays and the inventory period. With the exception of the placing of orders by the New York Central, little business has been noted. However, this road has a large number of orders yet to place. The Chicago, Great Western and the Chicago Burlington & Quincy have purchased a few tools and the Pennsylvania has an inquiry out for the Indianapolis shops.

Other industrial buyers include the Pennsylvania Engineering Works, New Castle, Pa., the Elliot Co., Jeannette, Pa., the Pittsburgh Malleable Iron Co., the Western Electric Co., Walter Scott Co., Plainfield, N. J., American Car & Foundry Co., the Michigan Alkali Co., and the Pettibone Mulliken Co., Chicago.

An interesting feature in the machinery market during the past year has been the elimination of large warehouses and show rooms by several dealers. Several dealers in Cleveland recently dispensed with show rooms and three representatives in Chicago shortly will don their stores and will maintain sales and business offices only.

Few sales are being produced in the used machinery, but it is thought the slackening will be only temporary and that the first of the year will bring an increase in this market.

Railroad Activity Continues To Feature Market

NEW YORK, Dec 24.—Railroad activity continues to dominate the machine tool market. The York Central continues to buy against its list of 100 machines, although total purchases have not as yet run heavy. Recent orders of this railroad include a 48-inch car wheel borer, this business going to an eastern builder. The Chicago, Great Western has closed on 66-inch vertical milling machine and the Chicago, Burlington and Quincy on a 42-inch planer, both orders going to an eastern manufacturer. Other buying includes a 5-foot boring and turning mill for the Western Electric Co., Chicago, a 6-foot radial drill for the Walter Scott Co., Plainfield, N. J., and a side head boring mill for the American Car & Foundry Co. A horizontal boring, milling and drilling machine with 6-inch spindle, a 7-foot saddle traverse, and a 10-foot circular table has been purchased in this district by the Michigan Alkali Co.

The market generally, however, reflects the holiday lull, both inquiries and actual orders being scattered. Early action is expected in the Southern railroad list, a portion of which may be closed before the first of the year. An Ohio manufacturer of lathes has recently advanced prices on an average of about 5 per cent. This action, however, is not regarded by the trade as particularly significant, as steadiness characterizes the market.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, etc., Page 90, Classified Machinery Section.

Crane demand is featured by a list of seven electric overhead cranes for the new Kearny, N. J., plant of the Western Electric Co. All bids are to be in Dec. 26. Buying is scattered.

Among scattered orders for foundry equipment placed recently are a 24-ton cupola for the American Car & Foundry Co.; a 12-ton cupola for the Essex Foundry Co.; Newark, N. J.; a 10-ton cupola for the Saco Lowell shops, Boston, and a 9-ton cupola for the Desplaines Foundry Co., Desplaines, Ill., this business going to the Whiting Corp. Additional equipment has been purchased by the American Car & Foundry Co.

Considerable interest was centered on the recent auction sale at the plant of Isaac G. Johnson Co., Spuyten Duyvil, New York, which was purchased by the state some time ago and which will shortly be dismantled. Included in equipment disposed of, was a 3-ton Moore electric furnace, purchased by the Otis Elevator Co., for its plant at Buffalo. The furnace cost $12,000 and will displace the two electric furnaces now installed.

A 15-ton Shepard electric crane, with 55-foot span, was sold for $500, and a 5-ton Pawling & Harnischfeger crane, 31-foot span, for $700.

Little is noted in the way of new foundry construction. A number of projects, however, are pending more favorable weather conditions. Included in new work now under contemplation is a 1-story foundry for the Fairmount Foundry & Machine Co., Philadelphia. Construction will get under way this spring. Plans are being prepared by the Stanley G. Flagg Co., Philadelphia, for the erection of a foundry building to replace the structure which recently suffered $20,000 damage by fire.

Announce Price Increases

PITTSBURGH, Dec. 24.—As the year ends the market on machine tools and cranes is far from active but is not entirely dull. The Pennsylvania Engineering Works, New Castle, Pa., closed on some drill presses while the Elliot Co., Jeannette, Pa., bought two radial drills. The Pittsburgh Malleable Iron Co., recently closed on nine grinders and the American Steel Foundries has deferred purchase of this type of equipment

until after the first of the year. Other single sales of new machine tools are noted and a fairly active market exists on used equipment, recent sales including a 30-inch boring mill, a large grinder, a 10-inch lathe, a 6-inch pipe machine, and a 3½-foot radial drill to five different buyers over a widespread territory.

The Pennsylvania railroad has added two small machines to its recently revived list but lacking appropriation, will probably defer purchases until after the first of the year. One development of interest in connection with the machine tool market is the fact that two manufacturers have announced through their dealers here, price increases of 10 per cent on portions of their lines. The Standard Sanitary Mfg. Co. is tabulating various bids made on its list of about 40 machines wanted for its new Baltimore plant but has closed on three No. 10 cupolas with the Whiting Corp., and two large blowers with the P. H. & F. M. Roots Co. Other sales of foundry equipment reported by the Whiting Corp. include a No. 7 cupola to the Birmingham Stove & Range Co., Birmingham, Ala.; one No. 6 and one No. 7 to the Essex Foundry Co., Newark, N. J.; a No. 5 to the Des Plaines Foundry Co., Des Plaines, Ill.; a 7-ton bottom-tapped ladle to the Valley Rolling Mills Co., New York; and a 36 x 48-inch class "A" tumbling barrel to the Milwaukee Gray Iron Foundry Co., Milwaukee, as well as core oven equipment to the Richmond Radiator Co., Uniontown, Pa. The American Steel Foundries Co., Pittsburgh, has an inquiry out for ladles; the most recent ladle order noted here involved two for the Westinghouse Electric & Mfg. Co., Trafford City, Pa., which was placed with the Whiting Corp. Sales of molding machines by the Herman Pneumatic Machine Co., have been fairly numerous, three large car wheel machines being bought by the Griffin Wheel Co., Erie, Pa., an order for two large rollover machines coming from the Lebanon Steel Foundry Co., Lebanon, Pa., and an order for two additional being filed by the Commonwealth Steel Co., Granite City, Ill. Single installations are ordered by the Chapman Valve Mfg. Co., Indian Orchard, Mass., the Raritan Foundry Co., Raritan, N. J., the Interstate Foundry Co., Cleveland, and the Dayton Malleable Iron Co., Ironton, O. Occasional crane purchases are noted as well as a few new inquiries. One sale of seven cranes is noted this week, details being withheld.

Prospects Look Brighter

CLEVELAND, Dec. 24.—The holiday season and the inventory period has caused a considerable slackening in the machinery and shop equipment market. General curtailment in automobile production which is expected to be in effect for a few weeks, will have a lessening effect on the demand from this source that has been found during the past quarter. Little business is expected until after Jan. 1.

Machine tool dealers and manufacturers in this district see a decided improvement in the sales outlook for the coming year. Inquiries in a fairly large volume now are before the trade, a condition which indicated a substantial business for the early part of the year. Plans have been started toward expansion in a number of industries, and it is thought much of this development will be in progress during the year. A number of railroads already have asked for prices on rather large lists of tools for the purpose of making estimates on tool costs for the year. This has been true especially with some of the western roads, and it is expected that inquiries for machinery from this source will be sent out early in the year.

As the year closes the New York Central rapidly is closing on the list of over 100 machines which was brought out around the first of December. Various companies are included in the orders being placed. The Southern has not closed on its recent list. The Pennsylvania has an inquiry out for 3 machines for the Indianapolis shops. No other railroad activity is reported. In the used machinery market a slight lull is noted, but it is expected that better business will be found after inventories have been completed. Second hand dealers have experienced a better business in the last quarter than has been realized in new machinery. Prospects for continued activity in this department are bright.

Buyers of locomotive cranes are making plans for equipment to be needed in the spring, but are doing little in the line of active buying at present. This is the normal condition for this time of the year. The market at the present time is listless and no action is expected for some time.

Holiday Season Delays

CHICAGO, Dec. 24.—Although several machinery houses enjoyed brisk business off their floors in the past week most machinery sellers are marking time until the holiday season is past, when they believe business will be much above the average of the past month. The Pettibone Mulliken Co. has placed a 42-inch x 42-inch by 16-foot planer, an 18-inch lathe and a shaper. One house sold a punch and shear to handle plates up to 1¼ inches to a Chicago interest. One machinery house disposed of three planers, several milling machines, drill presses and engine lathes in the past week.

A dealer in used machinery also found business off the floor better than for several weeks past. Neither the Union Pacific railroad nor the Chicago board of education has placed its list. Shortly after the turn of the year three machinery interests plan to abandon their stores and maintain offices only. The E. L. Essley Machinery Co. has reduced its capital from $200,000 to $40,000 but states this does not involve any change in sales policy. Most machinery houses in Chicago were closed from Saturday noon until Wednesday morning.

Crane Awards and Inquiries of the Week

Orders Placed

One locomotive hoist for Western Railway of Alabama, at Montgomery, Ala., to Whiting Corp., Harvey, Ill.

One 15-ton pillar crane for Yazoo & Mississippi railroad, to Whiting Corp., Harvey, Ill.

One locomotive hoist for Georgia railroad, at Augusta, Ga., to Whiting Corp., Harvey, Ill.

One 15-ton electric traveling crane for Northwestern Pacific railroad at San Francisco, to Whiting Corp., Harvey, Ill.

One 30-ton, one-motor traveling crane for Arkansas Power & Light Co., Pine Bluff, Ark., to Whiting Corp., Harvey, Ill.

One 5-ton jib crane for Nickel Plate railroad, at Cleveland, to Whiting Corp., Harvey, Ill.

Seven cranes for industrial interest in the Pittsburgh territory to a Wisconsin builder.

One 5-ton floor-operated crane for Dillon Bros. Mfg. Co., Wheeling, W. Va., to the Euclid Crane & Hoist Co., Euclid, O.

Seven special jib cranes for the Southern Wheel Co., Birmingham, Ala., to the Whiting Corp., Harvey, Ill.

One 25-ton standard-gage 8-wheel locomotive crane and 1½-yard clamshell bucket for the J. L. Shiely Co., Minneapolis, to the Orton & Steinbrenner Co., Chicago.

One 12-ton steam crawling-tread crane for the Dexter Portland Cement Co., Nazareth, Pa., to the Orton & Steinbrenner Co., Chicago.

One 12-ton gasoline crawling-tread crane and a 1-yard bucket for Harry A. Henske, St. Louis, to the Orton & Steinbrenner Co., Chicago.

Recent Industrial Business Changes

THE Fireproof Products Co., Inc., has transferred its main office and warehouse to 536-48 East 133rd street, New York, to a building especially designed for the company. At the new location the ground floor, 175 x 200 feet is set aside for storage purposes and is especially equipped to facilitate the handling of the company's line of materials including reinforcing steel, furring, wire fabric reinforcment, expanded metal, metal lath, wire, nails, concrete mixers, steel sash, etc. The sales department and business offices occupy the second floor. The company's Long Island City branch recently was installed in a new building at 582 Pierce avenue.

* * *

Wald Mfg. Co., Sheboygan, Wis., has decided to move to Maysville, Ky., about Jan. 1, where it will manufacture bicycle and motorcycle parts, accessories, etc.

* * *

The Columbus Structural Steel Co., the International Steel Products Co., and the International Derrick & Equipment Co., all of Columbus, O., have consolidated into an organization known as the International Derrick & Equipment Co. Harry M. Runkle is president.

* * *

Pittsburgh Gear & Machine Co., Twenty-seventh and Smallman streets, Pittsburgh, has been appointed distributor in that district by the Whitney Mfg. Co., Hartford, Conn., for the sale of the latter's chain products.

* * *

Lightning Sparker Mfg. Co., Chicago, has changed its name to the Howard Ignition Co.

* * *

Ridenour, Seaver & Kendig, Cleveland, factory representative, has enlarged its territory through opening an office at 838 Equitable building, Baltimore, where its business in Maryland, Virginia and the District of Columbia will be handled.

* * *

Kardong Bros., building and bridge contractor, has moved its offices from 1343 Filmore street, northeast, to 346 Buchanan street, northeast, Minneapolis.

Townsend Co., New Brighton, Pa., manufacturer of rivets, wire nails and wire, has moved its offices at Indianapolis, Ind., to 618-9 Fletcher Savings & Trust building. D. C. Niggle is district sales manager in charge of the Indianapolis office.

* * *

The Thomas Steel Products Co., Warren, O., has changed its name to the Eastern Ohio Mfg. Co.

* * *

The Chicago Pneumatic Tool Co., New York, has made the General Machinery Co., Spokane, Wash., its sole agent in the eastern part of Washington and the northern part of Idaho.

* * *

Moncrief Furnace Co. will move its manufacturing plant from 825 Long avenue, N.W., Cleveland, to the former plant of the Folding Box Co., East Forty-ninth street and the Wheeling & Lake Erie railroad.

* * *

The Lakewood Engineering Co., Cleveland, has placed the sale of its construction and paving equipment in the hands of Brown & Sites Co., 30 Church street, New York. The Brown & Sites Co. represented the Lakewood company from 1912 to 1918.

* * *

The Lake Superior Iron Ore association has moved from the Kirby building to 1450 Union Trust building, Cleveland.

* * *

Davis Keyseater Co., Rochester, N. Y., has acquired the business relating to keyseating machines from the Davis Machine Tool Co., Inc., that city.

* * *

The General Refractories Co., Philadelphia, has established an office at 1054 Ellicott square, Buffalo, with G. A. Forbes as district manager.

* * *

D. C. Noggle, district sales manager at Indianapolis, for Townsend Co., New Brighton, Pa., manufacturer of rivets, wire nails and wire, has moved his offices to 618-9 Fletcher Savings & Trust building.

H. D. Conkey & Co., Chicago, manufacturer of hand power and electric cranes, etc., has appointed H. P. Duval, 301 American Bank building, Kansas City, Mo., as sales agent for that territory and S. A. Gilliard, 405 Liberty building, Buffalo, for the Conkey products in that district.

* * *

The Concord Axle Co., Concord, N. H., has been taken over by Wurster Co., New York.

* * *

The plant of the Maryland Metal Products Co., has been purchased from Raymond J. Funkhauser, who recently bought the property, by M. P. Moller. It is reported the Crawford Automobile Co., owned by Mr. Moller, will occupy the plant having recently booked a large order for the manufacture of taxicabs.

* * *

Fearo Tillotson Foundry Co., Chicago, has changed its name to Fearon Foundry Co. and decreased its capital stock from $100,000 to $25,000.

* * *

Madigan Sheet Metal Mfg. Co., will open shop soon at 215 West Sixteenth street, Indianapolis.

* * *

Kenney Machinery Corp. has moved to southwest corner of Maryland street and Senate avenue, Indianapolis.

* * *

The Kinney-Rome Co., manufacturer of springs, metal beds, etc., has transferred its stock from 216 North Osage street to 1500 Madison avenue, Indianapolis.

* * *

C. W. Rood Engineering Co., Wisconsin Rapids, Wis., has taken over the machine shop business of Johnson & Sons and will commence manufacturing excavating and hoisting machinery. Johnson interests will take charge of the general machine and repair department of the Rood company.

* * *

Pilling & Co., Inc., has moved its headquirters to 1400 Bankers Trust building, 1315 Walnut street, Philadelphia. For many years the company had been located in the Real Estate Trust building, Philadelphia.

Another Reason for the Superiority of
MANSFIELD QUALITY SHEETS

Mansfield 15" x 16" Bottom Cast Ingots

Above is a view of our 15" x 16" *bottom* poured ingot, fractured in the middle of the ingot.

Note the solid and uniform appearance of the fracture, with a single line of blow holes more than two inches beneath the outer skin of the ingot. These blow holes, during the process of rolling, flatten down and the sides weld together.

Had this ingot been *top* cast, it would have required only 25 seconds to cast. But, being *bottom* cast—in groups of twelve—between four and five minutes were required, thus permitting the gases which cause blow holes, to pass off during the slow pouring. This slow pouring also reduces the amount of pipe cavity in the ingot.

Another advantage of the small ingot is that the metal after being poured, solidifies more rapidly which reduces the danger of segregation, and gives a more homogeneous steel.

Mansfield Bottom Poured Ingots are the basis of all good steel products—

18" x 20" Top Cast Ingots

Here is a view of fractures of an 18" x 20" *top poured* ingot of a similar grade of steel as shown above.

Note the blow holes 1½" long, lying next to the outer skin of the ingot. These blow holes, tearing from one to the other during the process of rolling, produce seams in the finished bar or sheet. These blow holes are caused by gases in the steel, the greater part of which *slow* pouring would have eliminated.

WABIK METAL

A special material for Vitreous Enameling. For Stove Door Panels, Splasher Backs, Broiler Pans, Table Tops, Refrigerators, Signs and other flat work.

Other Specialties:—

AUTOMOBILE SHEETS

Body Stock; Flat Fender and Hood Stock; Cowl Stock; Radiator Casing Stock; Crown Fender Stock.

METAL FURNITURE SHEETS

PICKLED and ANNEALED
ENAMELING STOCK
For Kitchen Utensils
MILK CAN STOCK
ELECTRICAL SHEETS

"Mansfield" Steel is the ultimate in Sheet Bars and in Sheets. It means satisfaction to the many users. Constant study of the needs of users, and continuous application of the results of such study, in the way of improved methods in our plants has established a reputation for reliability unsurpassed.

SHEET BARS INGOTS

WABIK

MANSFIELD SHEET & TIN PLATE COMPANY

MANSFIELD, OHIO

DISTRICT SALES REPRESENTATIVES

The L. D. Rockwell Co., 1106 National City Bldg., New York, N. Y.
Mr. D. B. Coey, 1018 Standard Oil Building, Chicago, Ill.
Mr. Geo. W. House, 1822 Ford Building, Detroit, Mich.
The L. D. Rockwell Co., 1201 National Bank Building, Cleveland, O.
Walter G. Clark, Inc., 106 N. Third St., St. Louis, Mo.
Walter G. Clark, Inc., 313 American Bank Bldg., Kansas City, Mo.
Mr. C. H. Beach, 617 Merchants Bank Bldg., Indianapolis, Ind.
Mr. A. P. Grenier, 640 Endicott Bldg., St. Paul, Minn.
Mr. Herbert P. Hill, 401 Continental Trust Bldg., Washington, D. C.
Wm. P. Horn Co., 237 Rialto Bldg., San Francisco, Cal.
Wm. P. Horn Co., 301 Kerchoff Bldg., Los Angeles, Cal.
Wm. P. Horn Co., Dekum Building, Portland, Ore.
Wm. P. Horn Co., 1426 L. C. Smith Bldg., Seattle, Wash.

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.15c
New York	3.54c
Philadelphia	3.47c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.47c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.25c
New York	3.64c
Philadelphia	3.57c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	3.75c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston, 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.00c
New York	3.64c
Philadelphia	3.57c
Philadelphia, 3/16-inch	3.82c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.515c
Buffalo	4.30c
Chicago	4.00c
Cincinnati	4.10c
Cleveland	3.60c to 4.06c
Detroit	4.15c
Los Angeles	5.20c
New York	4.34c
Philadelphia	4.10c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.10c
St. Paul	4.25c

NO. 28 BLACK SHEETS

Boston	5.45c
Buffalo	5.00c
Chicago	4.70c
Cincinnati	4.90c
Cleveland	4.50c to 4.65c
Detroit	4.85c
Los Angeles	6.50c
New York	4.50c to 4.70c
Philadelphia	5.15c
San Francisco	5.80c
Seattle	6.00c
St. Louis	4.85c
St. Paul	4.95c

NO. 28 GALVANIZED SHEETS

Boston	6.60c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.00c
Los Angeles	7.30c
New York	5.50c to 5.70c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	6.75c
St. Louis	6.00c
St. Paul	6.10c

BANDS

Boston	4.315c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	5.05c
New York	4.39c
Philadelphia	4.27c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	4.75c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.27c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.35c
Boston (shapes)	4.85c
Buffalo (rounds)	4.45c
Buffalo (shapes)	4.95c
Chicago (rounds)	4.00c
Chicago (shapes)	4.50c
Cincinnati (rounds)	4.25c
Cincinnati (shapes)	4.75c
Cleveland (rounds)	4.10c
Cleveland (shapes)	4.60c
Detroit (rounds)	4.30c
Detroit (shapes)	4.80c
Los Angeles (rounds)	5.60c
New York (rounds	4.40c
New York (shapes)	4.90c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh (rounds)	4.05c
Pittsburgh (sq. hex. and flats)	4.55c
San Francisco (rounds)	5.50c
Seattle (rounds)	5.50c
St. Paul (rounds)	4.25c

WELDED PIPE

Discounts from warehouse, New York City

Standard Steel Pipe

	Black	galvanized
¼-⅜-inch butt	—31	+ 2
½-inch butt	—41	—24
¾-inch butt	—46	—32
1/3-inch butt	—48	—34
3½-6-inch lap	—44	—30
7-8-inch lap	—41	—11
9-10-inch lap	—35	— 8
11-12-inch lap	—34	— 6

Wrought Iron Pipe

	Black	galvanized
¼-⅜-inch butt	+44	+78
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1-1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
3-6-inch lap	—11	+ 6
7-12-inch lap	— 3	+16

SCRAP PRICES, PAGE 1746, IRON AND STEEL PRICES, PAGE 1697, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1748

New Construction and Enterprise

LOS ANGELES—Superior Magnesite Corp., has been incorporated with $750,000 capital stock.

LOS ANGELES—No-Shift Gear Co. has been incorporated for $100,000 to manufacture patent gears.

NEW LONDON, CONN.—New London Storage Battery Mfg. Co. has been incorporated for $25,000 to manufacture storage batteries for John Barna, Clemente Tramontano, and Alice V. Buckley.

CHICAGO—Smith & Cawley, Inc., 1532 Hollywood avenue, was incorporated for $10,000 to manufacture and deal in plumbing and heating supplies and equipment, by W. P. Cawley, James Smith, and John Stone.

CHICAGO—The Scoville Mfg. Co., George Kerr, 224 Lake street, president, manufacturer of brass, bronze and wire rod products, is taking bids on general contract for $100,000, 3-story, 50 x 130-foot warehouse and office building.

CHICAGO—Ever Grip Wrench Co., 129 South La Salle street, has been incorporated for $30,000 and 600 shares no par value stock, to manufacture and deal in wrenches, parts and tools, by H. S. Coffin, M. B. Hitchcock, and Michael Farrell. The company will not be in the market immediately for plant or tools.

GALESBURG, ILL.—Galesburg Machine Works is building foundation for large addition to plant.

PEORIA, ILL.—Coulter & Proctor Stove Co. plans $40,000, 4-story, 150 x 200-foot building to replace that recently damaged by fire. Garrett DeF. Kinney is president, Water and Hamilton streets.

SIOUX CITY, IA.—Illinois Central railroad, 135 East Eleventh place, Chicago, is having plans drawn for constructing shops, roundhouse, etc., here at a cost of about $500,000. F. L. Thompson is chief engineer.

LEXINGTON, KY.—The Baker Car Co., W. G. Baker, manager, has let general contract to Blaw-Knox Co. for $30,000, 1-story, 60 x 320-foot factory building.

BALTIMORE—Holton Mfg. Co., James B. Holton, president, 119 East York street, has acquired plant of Unger & Hopf and will install additional machinery for manufacture of oil burners.

BALTIMORE, MD.—Plans are being finished for additions to foundry buildings of the Maryland state penitentiary, corner First and Eager streets. Theodore Wells Peitsch, American building, is architect. Col. Claude S. Sweezy is warden.

ELKTON, MD.—Maryland Tool Co. has been incorporated for $75,000 to manufacture and

(*Continued on Page* 1748)

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago**
San Francisco
Cincinnati **Detroit**

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	12.00 to 13.00
Boston (dealers)	12.00 to 13.00
Buffalo	17.50 to 18.00
Chicago	17.00 to 17.50
Cleveland	16.50 to 17.00
Cincinnati	14.50 to 15.00
Detroit (dealers)	14.50 to 15.00
Eastern Pennsylvania	16.75 to 17.50
New York (dealers)	12.50 to 13.00
Pittsburgh	19.00 to 19.50
St. Louis	15.75 to 16.25
Valleys (nominal)	17.75 to 18.25
No. 1 railroad steel New York (dealers)	13.50 to 14.00

COMPRESSED SHEETS

Buffalo	15.50 to 16.00
Chicago	13.50 to 14.00
Cleveland	14.00 to 14.25
Detroit (dealers)	13.00 to 13.50
Pittsburgh	17.50 to 18.00
Valley	15.75 to 16.25

BUNDLED SHEETS

Buffalo	10.50 to 11.00
Cincinnati	11.50 to 12.00
Cleveland	12.00 to 12.25
Detroit	9.00 to 10.00
Eastern Pennsylvania	14.50 to 15.00
Pittsburgh	16.00 to 16.50
St. Louis	9.00 to 9.50
Valley	14.00 to 14.25

SHEET CLIPPINGS, LOOSE

Chicago	8.50 to 9.00
Detroit	8.00 to 8.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston (dealers)	12.00 to 13.00
Chicago	19.50 to 20.00
Cincinnati	19.00 to 19.50
Cleveland	15.50 to 15.75
St. Louis	18.50 to 19.00

STOVE PLATE

Birmingham	14.00 to 15.00
Boston (consumers)	15.00 to 16.00
Buffalo	18.00 to 18.50
Pittsburgh	16.00 to 16.50
Chicago	19.50 to 20.00
Cincinnati (net iron)	13.00 to 13.50
Cleveland	18.00 to 18.50
Detroit (net ton) (dealers)	14.50 to 15.00
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	12.50 to 13.00
Pittsburgh	16.00 to 16.50
St. Louis	16.50 to 17.00

LOW PHOSPHORUS

Buffalo	20.00 to 21.00
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	21.00 to 22.00
Pitts., Billets and bloom crops	23.50 to 24.00

SHOVELING STEEL

Chicago	16.75 to 17.25
Pittsburgh	15.00 to 15.50
St. Louis	15.75 to 16.25

KNUCKLES, COUPLERS, SPRINGS

Chicago	20.50 to 21.00
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00
St. Louis	19.00 to 19.50

FROGS, SWITCHES, GUARDS

Chicago	17.00 to 17.50
Eastern Pennsylvania	16.75 to 17.00
St. Louis	16.25 to 16.75

BOILER PLATE, CUT

St. Louis	10.75 to 11.25

ANGLE BARS—STEEL

Chicago	18.75 to 19.25
St. Louis	16.00 to 16.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	14.00 to 14.50
Boston (dealers)	13.00 to 14.00
Buffalo	15.00 to 15.50
Cleveland, No. 1	14.50 to 15.00
Chicago No. 1	17.50 to 18.00
Chicago, No. 2	17.00 to 17.50
Cincinnati, No. 1	13.50 to 14.00
Detroit, No. 2	14.50 to 15.00
Eastern Pennsylvania	18.00 to 20.00
New York, No. 1 (dealers)	14.50 to 15.00
Pittsburgh, No. 1	15.00 to 15.50
Pittsburgh, No. 2	19.00 to 19.50
St. Louis, No. 1	15.00 to 15.50
St. Louis, No. 2	15.75 to 16.25

WROUGHT PIPE

Boston (dealers)	10.50 to 11.00
Buffalo	12.00 to 12.50
Eastern Pennsylvania	16.00 to 17.00
New York (dealers)	11.50 to 12.00

YARD WROUGHT

Boston	12.00 to 13.00
Eastern Pennsylvania	17.00 to 18.00

CITY WROUGHT

New York, long	12.50 to 13.00

BUSHELING

Buffalo	15.50 to 16.00
Chicago, No. 1	14.00 to 14.50
Chicago, No. 2	8.50 to 9.00
Cincinnati, No. 1	11.50 to 12.00
Cleveland, No. 1	12.50 to 12.75
Cleveland, No. 2	10.00 to 10.25
Detroit, No. 1	12.50 to 13.00
Detroit, No. 2 (new)	12.00 to 12.50
Detroit, No. 2 (old)	9.00 to 10.00
Eastern Pennsylvania	16.00 to 17.00
Pittsburgh, No. 1	15.50 to 16.00
St. Louis, No. 1	15.00 to 15.50

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston (dealers)	9.50 to 10.00
Buffalo	12.00 to 12.50
Chicago	9.00 to 9.50
Cincinnati	10.50 to 11.00
Cleveland	12.75 to 13.00
Detroit (dealers)	10.50 to 11.00
Eastern Pennsylvania	14.50 to 15.00
New York (dealers)	9.50 to 10.00
Pittsburgh	14.50 to 15.00
St. Louis	8.50 to 9.00
Valleys	12.75 to 13.25

CAST IRON BORINGS

Birmingham (chemical)	16.00 to 17.00
Birmingham (plain)	8.00 to 9.00
Boston (chemical)	10.50 to 11.00
Boston (dealers)	9.00 to 9.50
Buffalo	13.00 to 14.00
Chicago	12.50 to 13.00
Cincinnati	11.50 to 12.00
Cleveland	13.50 to 13.75
Detroit (dealers)	11.00 to 11.50
Eastern Pennsylvania (chem.)	15.00 to 16.00
Eastern Pennsylvania	14.00 to 15.00
New York (dealers' price)	9.50 to 10.00
Pittsburgh	15.50 to 16.00
St. Louis	12.00 to 12.50
Valleys	14.25 to 14.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	8.50 to 9.00
Cleveland	13.75 to 14.00
Detroit (dealers)	10.50 to 11.25
Eastern Pennsylvania	12.00 to 13.00
New York (dealers)	9.25 to 9.75

IRON AXLES

Birmingham	20.00 to 21.00
Boston (consumers)	31.00 to 32.00
Buffalo	28.00
Chicago	29.00 to 29.50
Cincinnati	23.00 to 23.50
Eastern Pennsylvania	25.00 to 30.00
New York (dealers)	25.50 to 26.00
St. Louis	28.00 to 28.50

IRON RAILS

Buffalo	18.00 to 19.00
Chicago	19.50 to 20.00
Cincinnati	15.00 to 15.50
St. Louis	17.00 to 17.50

PIPES AND FLUES

Chicago	12.00 to 12.50
Cincinnati	10.00 to 10.50
Cleveland	12.50 to 13.00
St. Louis	11.25 to 11.75

RAILROAD GRATE BARS

Buffalo	16.50 to 17.00
Chicago	18.25 to 18.75
Cleveland	18.00 to 18.50
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	14.00 to 14.50
St. Louis	15.00 to 15.50

FORGE FLASHINGS

Boston (dealers)	9.00 to 10.00
Chicago, small	11.50 to 12.00
Cleveland, small	12.75 to 13.00
Cleveland, large	12.75 to 13.00
Detroit (dealers)	11.00 to 11.50

FORGE SCRAP

Boston (dealers)	9.00 to 10.00
Chicago	17.00 to 17.50
Eastern Pennsylvania	14.50t o 15.00

ARCH BARS AND TRANSOMS

Chicago	24.00 to 24.50
St. Louis	21.00 to 21.50

ANGLE BARS—IRON

Chicago	23.50 to 24.00
St. Louis	21.00 to 21.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	9.50 to 10.00
Buffalo	13.50 to 14.00
Chicago	13.50 to 14.00
Cleveland	14.00 to 14.25
Eastern Pennsylvania	14.00 to 15.00
Pittsburgh	17.50 to 18.00
St. Louis	12.50 to 13.00

STEEL CAR AXLES

Birmingham	17.00 to 18.00
Boston (consumers)	18.00 to 20.00
Buffalo	17.00 to 17.50
Chicago	20.50 to 21.00
Cleveland	19.00 to 20.00
Eastern Pennsylvania	21.00 to 23.00
New York (dealers)	15.00 to 15.50
Pittsburgh	21.50 to 22.00
St. Louis	19.00 to 19.50

SHAFTING

Boston (consumers)	20.00 to 21.00
Chicago	23.50 to 24.00
Eastern Pennsylvania	21.50 to 22.50
New York (dealers)	14.50 to 15.00
St. Louis	19.00 to 19.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	15.50 to 16.50
Birmingham, iron	15.00 to 16.00
Boston (consumers)	20.00 to 21.00
Buffalo	18.50 to 19.00
Chicago, iron	20.00 to 20.50
Cincinnati	14.50 to 15.00
Eastern Pennsylvania	19.50 to 20.50
New York iron (dealers)	15.50 to 16.00
Pittsburgh, iron	21.00 to 21.50
Pittsburgh, steel	21.50 to 22.00
St. Louis, iron	18.00 to 18.50

NO. 1 CAST SCRAP

Birmingham, cupolla	18.50 to 19.00
Boston (consumers)	22.00 to 23.00
Buffalo	19.50 to 20.00
Chicago, cupola	22.00 to 23.00
Cincinnati No. 1 machinery cupola (net tons)	20.00 to 20.50
Cleveland, cupola	21.00 to 22.00
Detroit (net tons) (dealers)	18.00 to 18.50
Eastern Pennsylvania, cupola	20.00 to 21.00
New York, cupola (dealers)	17.00 to 17.50
Pittsburgh, cupola	21.50 to 22.00
San Francisco	28.00
St. Louis, railroad	20.00 to 20.50
St. Louis, agricultural	20.00 to 20.50
Valleys	21.00 to 22.00

HEAVY CAST

Boston (consumers)	19.00 to 20.00
Buffalo (breakable)	15.50 to 16.00
Cleveland	16.00 to 16.25
Detroit (automobile) (net ton)	22.50 to 23.00
Eastern Pennsylvania	18.00 to 18.50
New York (dealers)	16.50 to 17.00
Pittsburgh	19.00 to 19.50

MALLEABLE

Boston (railroad)	18.00 to 19.00
Buffalo	19.00 to 19.50
Chicago, railroad	20.50 to 21.00
Chicago, agricultural	19.50 to 20.50
Cincinnati, agricultural	15.50 to 16.00
Cincinnati, railroad	16.00 to 16.50
Cleveland, agricultural	19.50 to 20.00
Cleveland, railroad	20.00 to 20.50
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania, railroad	17.00 to 18.00
Pittsburgh, railroad	20.00 to 20.50
St. Louis, agricultural	17.00 to 17.50
St. Louis, railroad	17.50 to 18.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	15.00 to 15.50
Boston (dealers)	13.00 to 14.00
Chicago	18.00 to 18.50
Cleveland	17.50 to 18.00
Detroit	14.50 to 15.00
Eastern Pennsylvania	18.50 to 19.50
New York (dealers)	14.00 to 14.50
Pittsburgh district	20.50 to 21.00
St. Louis	17.50 to 18.00

LOCOMOTIVE TIRES

Chicago	18.25 to 19.25
St. Louis	16.25 to 16.75

LOW PHOSPHORUS PUNCHINGS

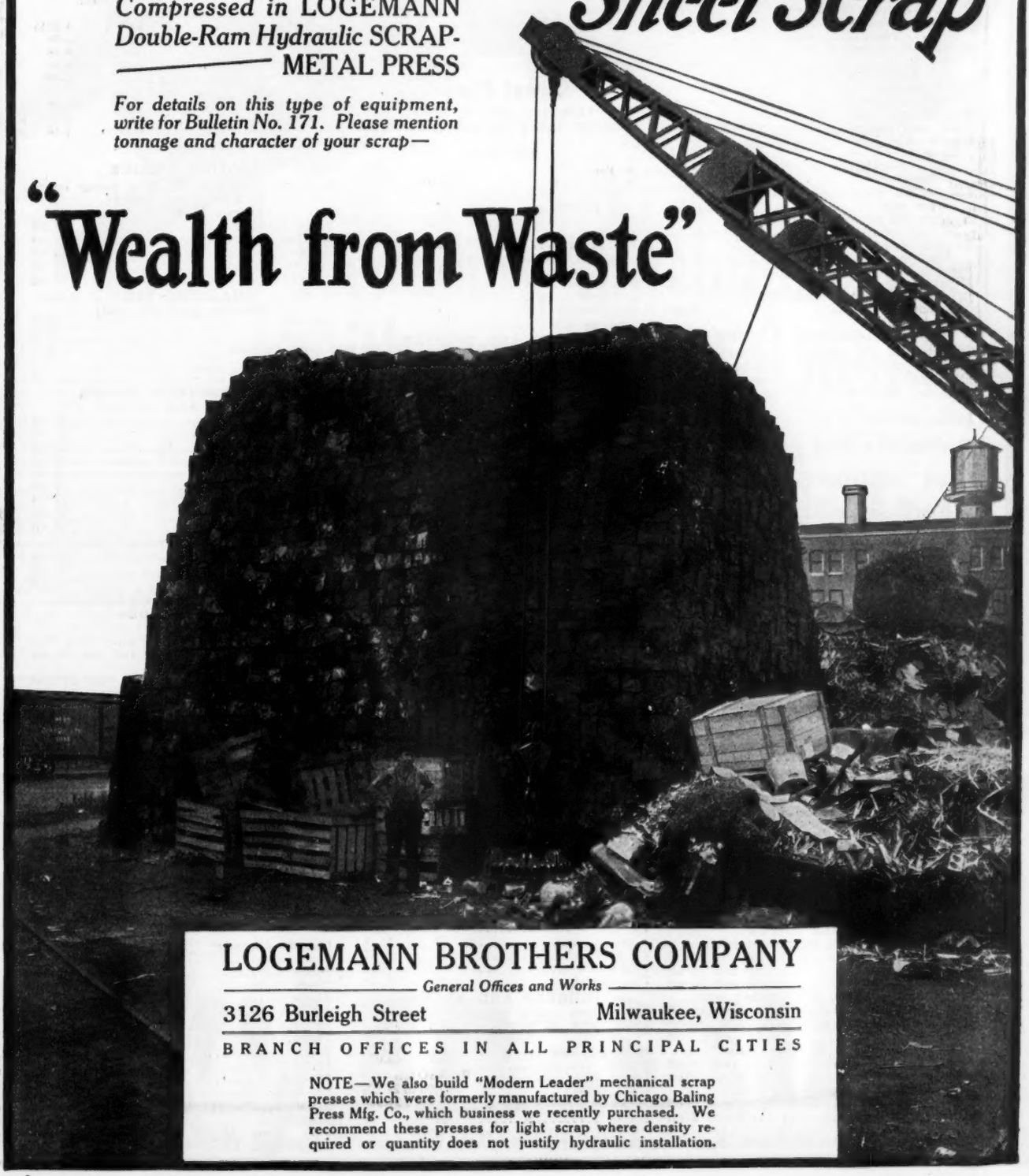
Chicago	18.00 to 18.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00

Almost 2000 Tons - of "LOGEMANN HYDRAULIC-COMPRESSED" Sheet Scrap

Compressed in LOGEMANN *Double-Ram Hydraulic* SCRAP-METAL PRESS

For details on this type of equipment, write for Bulletin No. 171. Please mention tonnage and character of your scrap—

"Wealth from Waste"



LOGEMANN BROTHERS COMPANY

General Offices and Works

3126 Burleigh Street Milwaukee, Wisconsin

BRANCH OFFICES IN ALL PRINCIPAL CITIES

NOTE—We also build "Modern Leader" mechanical scrap presses which were formerly manufactured by Chicago Baling Press Mfg. Co., which business we recently purchased. We recommend these presses for light scrap where density required or quantity does not justify hydraulic installation.

Construction and Enterprise

(*Continued from Page* 1744)

deal in tools, etc., by Louis B. Blue and Paul Spencer.

OAKLAND, MD.—United States Auto Chain & Hook Co., Grafton, W. Va., reported as planning to move plant here and contemplates enlargements.

BOSTON—The Tidewater Engineering Co. has been incorporated by Robert E. Smith, Arthur W. Smith, Gloucester, Mass., and Leo A. Brissette, Greenwood, Mass.

BOSTON—United Metals Separating & Refining Co. of Massachusetts, has been incorporated recently with $100,000 capital stock.

HOPEDALE, MASS.—The Draper Corp. plans building boiler plant here.

SPRINGFIELD, MASS.—The Union Metals Products Co. has been incorporated by George Smith, Michael H. Smith, Springfield, and Hinsdale Smith, South Hadley, Mass.

(*Continued on Page* 1752)

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron.$6.45
Mesabi bessemer, 55 per cent iron.... 6.20
Old Range nonbessemer, 51½ per cent iron 5.70
Mesabi nonbessemer, 51½ per cent iron 5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent ..... 10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent..... 13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent ..... 9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent..... 10.00 to 10.50
Swedish and Norwegian low phosphorus, 68 per cent.... 11.00 to 12.00
Swedish foundry or basic, 66 to 68 per cent ..... 9.25 to 10.00
Spanish foundry or basic, 50 to 54 per cent..... 9.00

Manganese Ores

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent. ....40 to 42 cents c.i.f. tidewater
Indian, minimum 47 per cent. ....40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent. ....41 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton.$19.00 to $23.50
Washed gravel, imported, duty paid eastern tidewater, per net ton .....$20.00 to 21.00

Rivets

Structural rivets, Pittsburgh.. 2.90c
Rivets, 7/16-in. and smaller. ....65, 10 and 5 off

Nuts and Bolts

(Up to 1¼ and 1½ inches inclusive)

Hot pressed square or hexagon blank .....$4.50 off list
Hot pressed square or hexagon tapped .....$4.50 off list
Cold punched square or hexagon blank .....$4.00 off list
Cold punched, square or hexagon.... .....$4.00 off list
Cold punched semifinished hexagon nuts ½-inch and larger.....75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller.....80 and 5 off
Price f.o.b. Pittsburgh, packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread .....60 and 10 off
Cut thread .....60 off
Larger and longer.....60 off

MACHINE BOLTS
(¾ x 4 inches, hot pressed nuts)

Rolled thread .....60 and 10 off
Cut thread .....60 and 10 off
Larger and longer .....60 and 10 off
((¾ x 4 inches, cold punched nuts)
Cut thread .....50, 10 off
Larger and longer .....50, 10 off
Lag screws .....65 and 10 off
Plow bolts Nos. 1, 2 and 3 heads.... .....50 and 10 off
4 to 10 heads .....50-10 + 20 off
Flat and round head stove bolts..... .....75, 10 and 5 off
Other stove bolts .....75 and 5 off
Tap bolts .....25 and 10 off
Bolt ends with hot pressed nuts..... .....60 and 10 off
Bolt ends with cold punched nuts.... .....50 and 10 off
Blank bolts .....60 and 10 off
Rough stud bolts with nuts..... .....50 off

WASHERS

Wrought washers .....$5.00 to $5.50 off

Steel Pipe

(Effective April 19, 1923)

Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+11	+59
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch ..... 23 off
2½ and 2¾-inch ..... 33 off
3-inch ..... 36 off
3¼ to 3¾-inch .....38½ off
4 to 13-inch ..... 42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch .....+22
1¾-inch .....+12
2 and 2¼-inch .....+ 2
2½ to 3-inch 3
3¼ to 4½-inch 5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch ..... 51 off
1¼ and 1½-inch ..... 43 off
1¾-inch ..... 27 off
2 and 2¼-inch ..... 18 off
2½ and 2¾-inch ..... 28 off
3 and 3¼-inch ..... 32 off
3½ and 3¾-inch ... . 33 off
4-inch ..... 37 off
4½ and 5-inch ..... 29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch ..... 34 off
3½ and 3¾-inch ..... 35 off
4-inch ..... 39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING
Base Discounts

Carbon, 0.10 to 0.20 per cent..... 83 off
Carbon, 0.30 to 0.40 per cent..... 81 off
Carbon, 0.40 to 0.50 per cent....net price
Plus differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
(Effective April 19, 1923)

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

SCRAP PRICES, PAGE 1746, WAREHOUSE PRICES, PAGE 1744, IRON AND STEEL PRICES, PAGE 1748

SIVYER S CASTINGS

DEPENDABLE

Axle housing end made in Sivyer Electric Steel. Its sections vary from 3/8 to 1 1/2 inches.

Reducing machining costs with experimental molding

PATTERNS for the axle housing end shown above were sent to us with a request to attempt to devise molding methods that would do away with expensive rejections after partial machining. Our experimental department studied the molding problem, made successive sets of castings, sawed them apart in several places, and after producing absolutely sound castings made recommendations for quantity production. Of all the Sivyer castings since produced from these patterns, the manufacturer has not rejected a single one either before or after machining. The costs of this part are consequently much lower than formerly.

Send Blue Prints

A number of aggressive manufacturers have divided their steel parts into three general classes: those that can be profitably forged; those that cannot be forged economically, or at all, but can be cast in ordinary steel; and those that can be cast most reliably and economically in Sivyer Electric Steel.

The last class includes especially castings with thin and sharply varying sections, and castings that have to be true to pattern, clean and smooth in order to fit the assembly with the minimum of finishing.

With Sivyer Electric Steel we have been able to show certain engineers very decided advantages and economies, not only as against ordinary steel castings and hammered forgings, but also as against malleable castings and fabricated steel.

A certain manufacturer formerly fabricated rocker beams for a crawler chassis by welding two stampings and then pressing in, and welding, sections of steel tubing. The shortcomings, and unnecessary expense of this method were not realized until it was found that the stampings did not have the body required to carry certain desirable attachments. Forgings were impractical. Open hearth practice does not permit the high temperatures necessary for casting thin sections such as those of the design in question. The manufacturer's organization naturally turned to Sivyer Electric Steel. It proved to have all the qualities desired and effected an appreciated reduction in the final cost of the part.

In a number of other cases we have been able to free certain engineers from the handicaps of hammered forgings and in effect give them much greater freedom in design.

We are especially interested in making experimental castings for manufacturers with problems like those described above. If you will send us your blue prints for troublesome parts, together with a statement of your difficulties, we will study the problems involved and recommend possible solutions without obligation on your part.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	Stacks- No.	In	Output- Total	Av. daily
1907				
January	376	311	2,174,801	70,155
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,249,732	
1908				
January	398	139	1,081,813	34,897
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,718,579	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,888	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	8,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,547,012	118,233
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375

Ingots and Castings

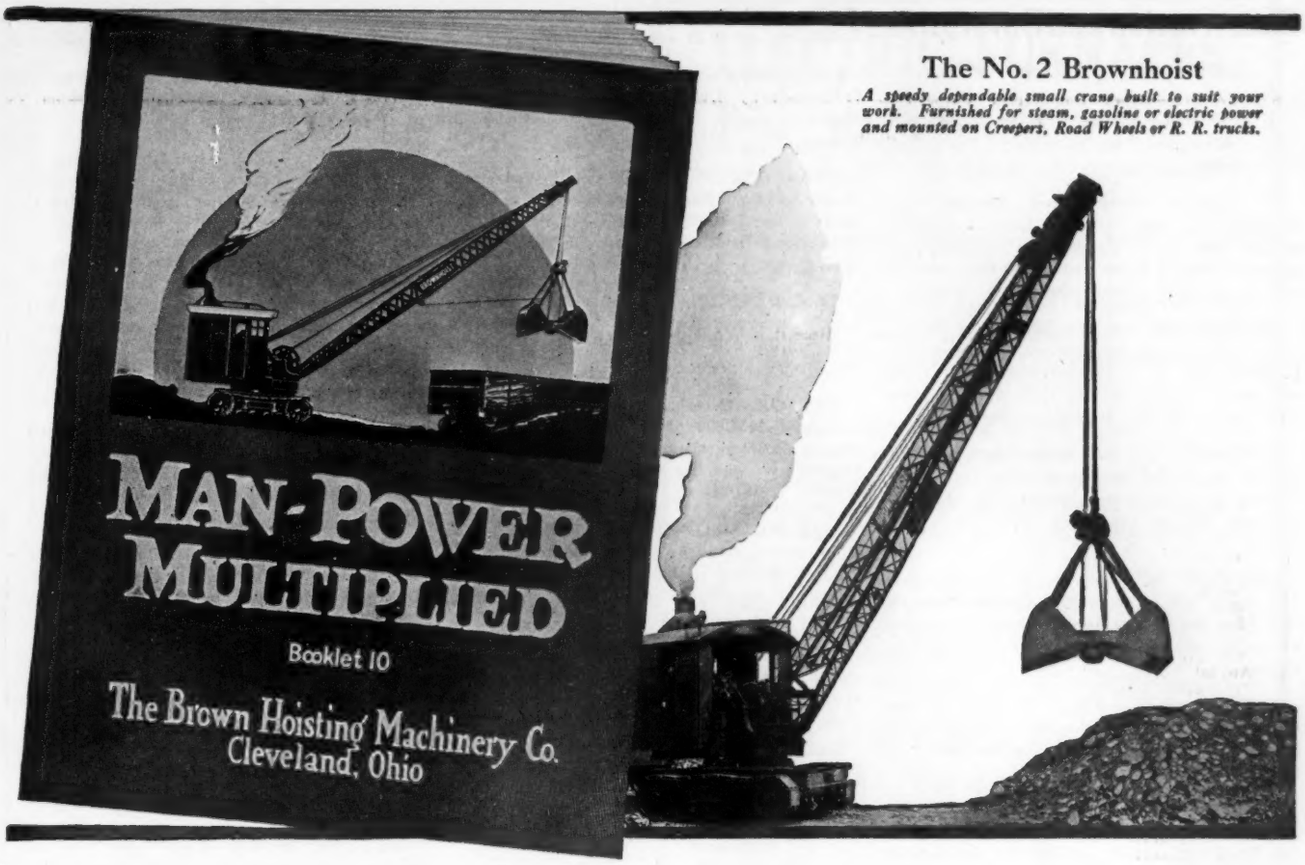
By American Iron and Steel Institute

	Ingots	Castings	Total
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797
1922	34,568,418	1,034,508	35,602,926

Monthly Ingot Output

Gross Tons

1922	84.15 per cent of capacity	Calculated total
January	1,593,482	1,891,857
February	1,745,022	2,071,772
March	2,370,751	2,814,667
April	2,444,513	2,902,240
May	2,711,141	3,218,794
June	2,634,477	3,127,775
July	2,487,104	2,952,806
August	2,214,582	2,629,256
September	2,373,779	2,818,261
October	2,872,415	3,410,265
November	2,889,297	3,430,309
December	2,779,890	3,300,416
Total	29,116,453	34,568,418
1923	95.35 per cent	
January	3,644,629	3,822,369
February	3,294,264	3,454,918
March	3,858,675	4,046,854
April	3,760,997	3,944,412
May	4,000,695	4,195,800
June	3,574,567	3,748,890
July	3,350,829	3,514,241
August	3,506,755	3,677,771
September	3,161,964	3,316,166
October	3,382,986	3,547,966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BROWNHOIST

MATERIAL HANDLING MACHINERY

Construction and Enterprise

(*Continued from Page* 1748)

ST. LOUIS—Brock Engineering Corp. has been incorporated for $100,000 to manufacture steam boilers, etc., by Edward J. Brock and V. D. Sears.

ST. LOUIS—Warren Steel Castings Co., Kingshighway and Fairview, has let contract to Edmunds Lund Construction Co. for constructing $60,000, 1-story, 60 x 200-foot concrete and steel foundry and open-hearth plant.

NEWARK, N. J.—A $1,000,000 automobile service and storage building will be erected by L. Bamberger & Co., department store. Plans by Abbott Merkt & Co., 175 Fifth avenue, New York, call for 5-story structure.

NEWARK, N. J.—A $65,000 factory building will be erected by Pyrene Mfg. Co., manufacturer of fire extinguishers. The proposed structure will be one story high, 300 x 310 feet.

NEWARK, N. J.—New Jersey Commercial Body Co., Inc., 225 Elizabeth avenue, has been incorporated with $100,000 capital to carry on general automobile and garage business.

ALBANY, N. Y.—Albany Hardware & Iron Co. plans 7-story, 120 x 200-foot warehouse costing about $500,000. William I. Baker, 41 State street, is president.

BROOKLYN, N. Y.—Frank Feraro, 825 Blake avenue, plans $17,000 1-story, 50 x 100-foot brick and cement building for manufacture of pipe nipples.

BROOKLYN, N. Y.—Brooklyn Metal Stamping Corp., has been incorporated for $10,000 by D. H. Engleson, G. Weinstein and J. C. Fishel with O. L. Dann, 291 Broadway, as attorney.

BROOKLYN, N. Y.—Welcome Sheet Metal Works, has been incorporated for $10,000 to carry on sheet metal business, by N. and R. Hersh, S. Fischer and J. T. Robbins, 20 Graham avenue, as attorney.

BROOKLYN, N. Y.—John Roberston Co. has been incorporated for $500,000 to carry on engineering business and construct machinery, by L. A. Brown, A. R. Hardy and N. F. Roberstson. Clark, Reynolds & Hinds, 165 Broadway, is attorney.

GREENPORT, N. Y.—J. S. Gafga Engine Corp. has been incorporated for $10,000 by N. and L. N. Goldin and N. F. Powers, with F. J. McLean, 140 Nassau street, New York as attorney.

NEW YORK—Hogan & Son, has been incorporated for $150,000 to deal in iron and steel, by P. F. Hogan, J. Fuchs, and G. Master, with S. V. Ryan, Albany, N. Y., as attorney.

NEW YORK—Reiche & Penner has been incorporated for $25,000 to manufacture and deal in iron work, by F. and E. Penner and R. C. Maass, with J. A. Nooney, 100 William street, as attorney.

NEW YORK—Economy Bronze & Iron Works, has been incorporated for $15,000 to deal in iron and bronze products, by L. Konopnicki, C. and M. Szan, with Joffe & Joffe, 141 Broadway, as attorney.

NEW YORK—Signal Distributing Co., has been incorporated for $30,000 to deal in and manufacture machinery, by L. Luntz, F. Kay and H. Nugent, with Deiches & Goldwater, 63 Wall street, as attorney.

NEW YORK—A $250,000 power plant will be erected by Distinctive Pictures Corp., 366 Madison avenue, at its proposed studio in Queens.

CHARLOTTE, N. C.—Smith-Wadsworth Hardware Co., East Trade street, was damaged by fire Dec. 18 with loss of about $250,000. Stock and equipment were badly damaged.

NEW BERN, N. C.—Mill Supply Co. has been incorporated for $150,000 to manufacture and deal in mill supplies, by W. B. Blades and A. F. Patterson.

DAYTON, O.—Duro Pump & Mfg. Co., will build $175,000 plant and will install machinery costing about $30,000, according to preliminary sketches prepared by architect Schenck & Williams.

IRONTON, O.—Dayton Malleable Co. plans extensive improvements including 60 x 200-foot building to be used for annealing department. O. H. Schweickart is supervising the work.

WESTERVILLE, O.—Kilgore Mfg. Co. was damaged by fire Dec. 15 with loss of approximately $50,000 to plant and machinery. Company manufactures toy pistols.

LANCASTER, PA.—The Carbon Steel Casting Co. is completing plans for a new foundry to cost about $125,000, to be erected on South Prince street. Work of construction will start soon.

NORRISTOWN, PA.—Stanley G. Flagg plant five was damaged by fire Dec. 9 with loss of about $15,000 to $20,000. Much of the machinery in damaged plant can be salvaged.

PHILADELPHIA—Contract for erecting $75,000 shop for Electrical Development & Machine Co. has been awarded to Franklin M. Harris & Co.

PHILADELPHIA—Work will be started shortly by Valentine H. Smith & Co., Inc., for 5-story plant addition costing $65,000. The Furness Evans Co. is architect.

PHILADELPHIA—Contract for the erection of a $73,000 warehouse has been awarded by E. F. Haughton Co. The proposed structure will be three stories high, of brick.

PHILADELPHIA—General Electric Co. has awarded $300,000 contract to White Construction Co. for erecting plant at Sixty-eighth street and Elmwood avenue.

PHILADELPHIA—The Philalelphia Rust-Proof Co. has been incorporated for cleaning of metal products, with sand blasting, pickling and other departments. L. F. Hirsch and M. G. Herbach head the company with plant at Howard and Montgomery streets.

PITTSBURGH—F. B. Herold Co. has been incorporated for $15,000 to buy, sell and deal in iron, steel, brass, etc.

PAWTUCKET, R. I.—Pressed Metal Co. will begin construction immediately on $500,000 plant for manufacture of automobile parts. Approximately $400,000 will be spent on equipment. Dutee Wilcox Flint, motor car dealer; Darius Goff, mill owner; and Frank J. Powers, mill manager, are interested.

PIERRE, S. DAK.—Miller Mfg. Co., Freeman, has been incorporated for $500,000 to manufacture road making machinery, by Henry J. Miller, Jacob P. Waltner and R. R. Krehbiel.

CHATTANOOGA, TENN. — International Harvester Co. plans constructing addition to plant on Chester street.

MEMPHIS, TENN.—Ira Landrum has purchased site on Adams avenue and has started constructing brick building, part of which will house Southern Machinery & Foundry Co.

NASHVILLE, TENN.—The Allen Mfg. Co., Union and Tenth avenues, manufacturer of ranges, parlor furnaces, etc. plans 80x100-foot extension, two stories, of brick and concrete, at cost of from $40,000 to $50,000. Considerable machinery is to be purchased. W. F. Allen is president and general manager.

DALLAS, TEX.—Pittsburgh Valve Foundry & Construction Co., Pittsburgh, has been licensed to do business in Texas with $3,500,000 capital. State headquarters is at Houston, in charge of Ike D. White.

SPOKANE, WASH.—Machinery Engineering Co. has been incorporated for $95,000 by Albert G. Starkey, Paulsen building, and his associates.

TACOMA, WASH.—City officials have authorized construction of first unit of Lake Cushman power project involving about $10,000,000.

CHARLESTON, W. VA.—Ideal Mfg. Co. has been incorporated by James W. Smiley and S. L. Walker to manufacture mining machinery with $5000 capital stock.

WESTON, W. VA.—Plans have been made by the Danser Mfg. Co., manufacturer of mine, mill and oil field supplies, to enlarge its plant here. The capital stock will be increased from $50,000 to $100,000 for the purpose.

MARSHFIELD, WIS.—The garage and shop of Loiselle Bros, was burned to the ground Dec. 10, causing loss of $50,000. Arrangements are being made to rebuild immediately.

MILWAUKEE—Contracts have been let by the American Mill Supply Co., now at 1718 Vliet street, to build a new factory, warehouse and office building 40x135 feet, at 1371 Auer avenue.

MILWAUKEE— Bentley Bros., 808 South Pierce street, has taken contract to build 2-story garage and repair shop, 60x120 feet, costing $50,000, for Argo Investment Co. on Fifth near Sycamore street.

MILWAUKEE—A state charter has been granted American Plier & Tool Corp., capital stock $50,000. The incorporators are Walter S. Bronk, Oliver O'Boyle, attorney, and George F. Tidmarsh, 133 Third street. They will manufacture pliers, wrenches, and other manual tools.

MILWAUKEE—Manegold Mfg. Co., has been incorporated for $50,000 by Frank W. Manegold, for many years executive of Briggs & Stratton Co., manufacturer of ignition switches, automobile parts, etc., and will manufacture automobile body fittings and metal supplies of all kinds. Other incorporators are William H. Manegold and Arthur A. Mueller, 105 Wells street, attorney.

RACINE, WIS.—Belle City Malleable Iron Co. has received permit from city to build 75x155-foot section to annealing building as part of $500,000 program of improvements.

RACINE, WIS.—Articles of incorporation have been filed by Reid Clipper Co., for $50,000 to manufacture motor-driven hair clippers for barber shops. M. Andis, H. E. Vincent and H. T. Cochrane are behind the enterprise.

A KEEN EDGE

on a chisel or other hand-driven tool is more important than a keen edge on a power-driven tool *because* a hand tool cuts more slowly the moment the edge dulls, unless the operator increases the force of his blows or the pressure applied

Firth-Sterling Special
TOOL STEEL

will hold a keen edge which gives more rapid work, greater output and at the same time saves unnecessary effort on the part of the man behind the tool

UNIFORM PRICE
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Keenly competitive markets and narrower margins of profits have thrown added responsibility upon the shoulders of manufacturers everywhere.

The cost of producing a given article must come down.

You are looking for a practical solution to this problem and no doubt have considered the high labor costs attendant upon all heating operations.

We do not offer electric furnaces as a solution to all of your heating problems; but we do say most emphatically that the use of electric heating furnaces will aid materially in establishing a better balance between the production cost and the selling price.

The broad and practical experience of our engineers, who have been the pioneers in this field, is always available to help you in securing the most efficient electric heating equipment.

GEORGE J. HAGAN COMPANY
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Red Label Drill Rod
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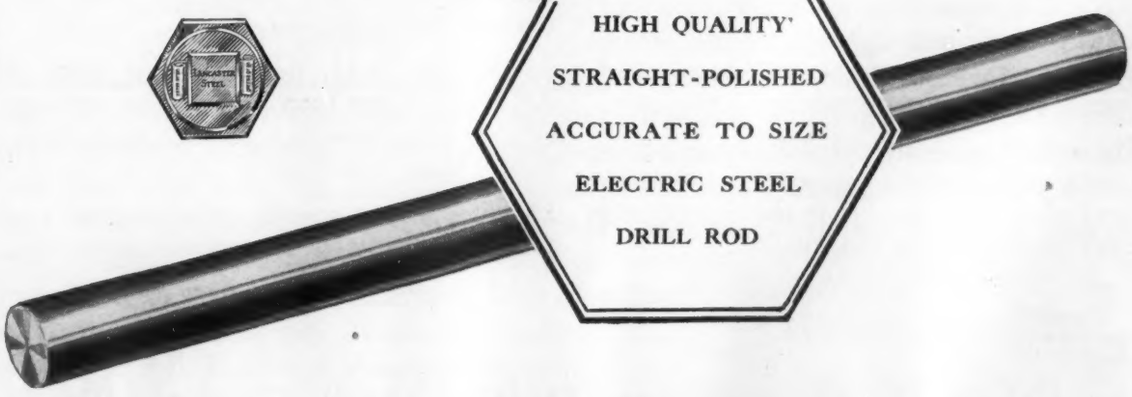
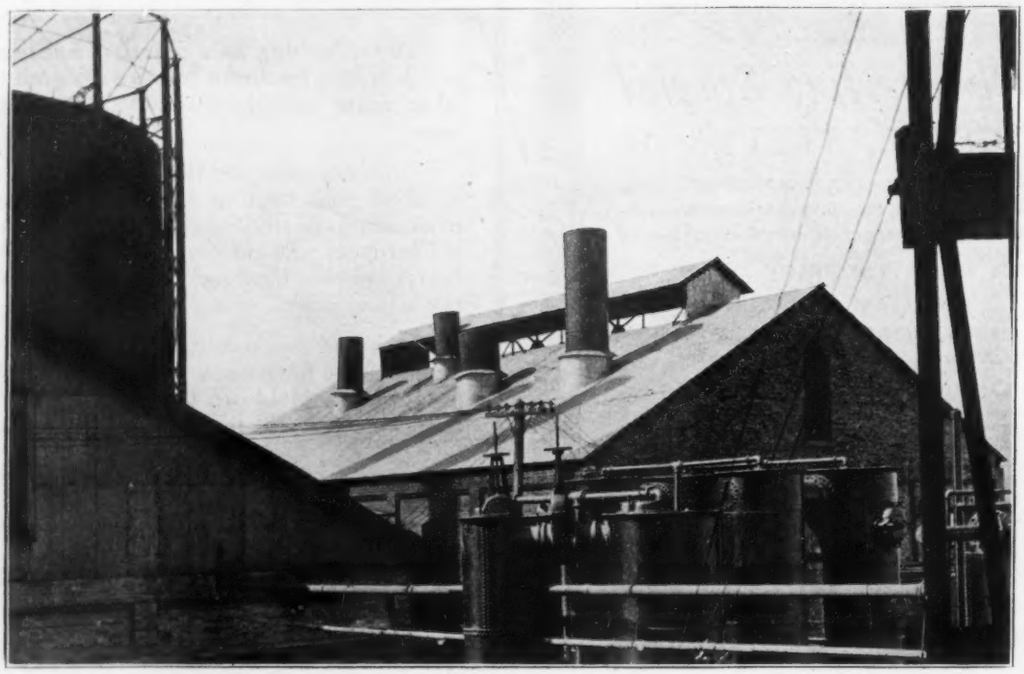


LANCASTER STEEL PRODUCTS CORPORATION
MILLS LANCASTER, PA. U.S.A.

NEW YORK PHILADELPHIA HARTFORD BUFFALO BOSTON DETROIT

ARMCO INGOT IRON

TRADE MARK



Gas Plant, San Antonio, Texas. The roof is 24 gage galvanized ARMCO-Ingot Iron.

This gas plant has a new roof
and it is ARMCO-Ingot Iron

Sulphurous acid fumes from coal used in gas-making, certainly test the durability of sheet metal.

ARMCO-Ingot Iron, for many years past, has proved under such actual service conditions that its service life is much longer than common steel.

By actual analysis, ARMCO-Ingot Iron contains less than one-sixth of one per cent of impurities. It is the purest iron ever placed on the market.

It was only natural, then, that ARMCO-Ingot Iron should be chosen for the new roof of the San Antonio Gas Plant. In the long run it will prove the most permanent and economical.

In the gas field, thousands of tons of ARMCO-Ingot Iron is used for roofing, siding, smokestacks, tanks, gasholders, tubes, pipe, and fences.

Detailed facts, specific information, and proof are ready for any person interested.

ARMCO Ingot Iron

The American Rolling Mill Co.
Middletown, Ohio

ARMCO Ingot Iron

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We mean—if the equipment you are using requires high upkeep and maintenance, giving in return poor service, a change in design will probably eliminate the trouble.

Hyatt roller bearings incorporated in your new designs will reduce wear and friction, therefore lower operating costs. These durable bearings will give years of satisfactory service without adjustment or replacement.

Will you allow our engineers in the Chicago, Pittsburgh and Philadelphia districts to study your problems and work with you on the remedy?

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BLACK AND GALVANIZED STEEL

AND

"GENUINE OPEN HEARTH IRON"
PURE IRON — COPPER ALLOY
RUST RESISTING

SHEETS AND FORMED PRODUCTS
ALL GAUGES, WIDTHS AND LENGTHS

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Special "High Grade"
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A General Purpose, High Speed Steel Without a Peer

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L-XX is especially recommended for turning, boring, planing, slotting and shaping tools. It is also used extensively in twist drills, and all forms of milling cutters, gear cutters, taps, reamers and special dies.

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Haven't had any trouble since."

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"That means the steel has been put through a special process. I guess it's a lot of extra trouble, but it's certainly worth while."

To obtain "Wrought Steel" is a "lot of extra trouble". The steel is first rolled and then hydraulically forged into a wheel under enormous pressure. The result is a homogeneous structure, free from sand spots, blow holes and other irregularities that cause fracture.

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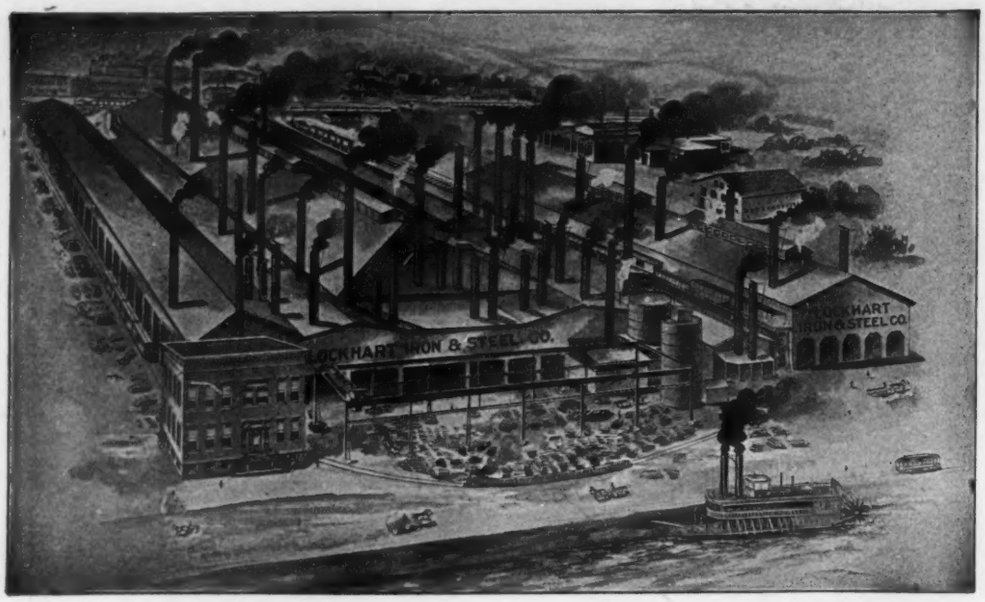

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for locomotive stay bolts.

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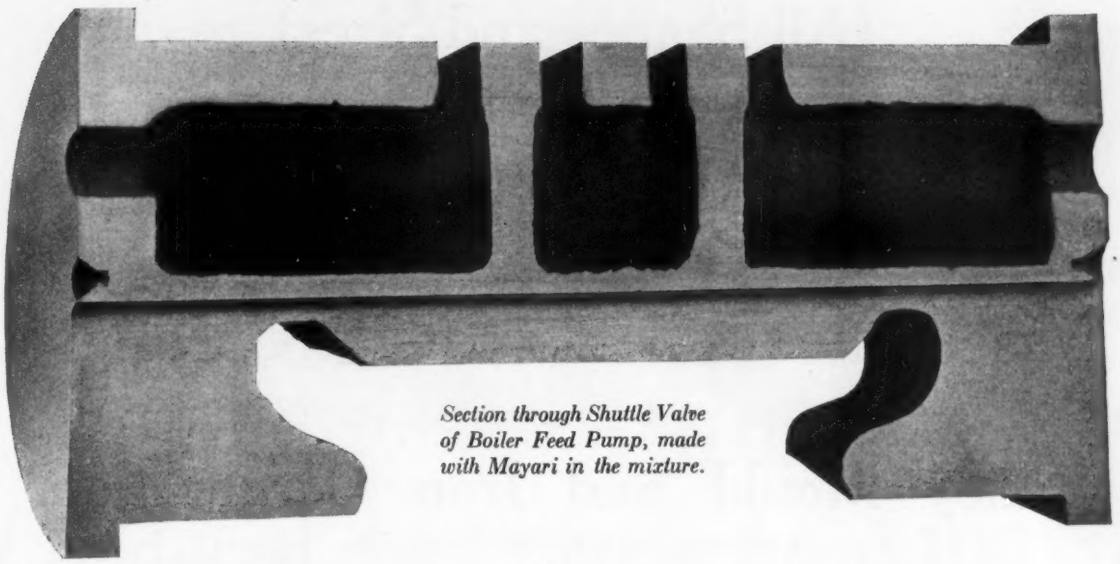

Section through Shuttle Valve of Boiler Feed Pump, made with Mayari in the mixture.

To minimize rejections on your small castings

THE manufacture of small, high-grade castings, especially those of intricate design, is simplified by the use of proper percentages of Mayari in the mixture.

Fluidity for thin sections is possible without the use of high phosphorus—this because of the long life and hot metal with Mayari additions. Segregation and spongy spots are eliminated.

The softening effect of the nickel and the hardening effect of the chromium can be adjusted with proper use of silicons to give required degree of hardness—and fine, close-grained castings.

Castings made with Mayari are clean, sharp, machine readily, take a smooth polish, and withstand extreme heat. Losses from defective castings are greatly reduced by Mayari because of its de-oxidizing effect.

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(All Shapes and Sizes)

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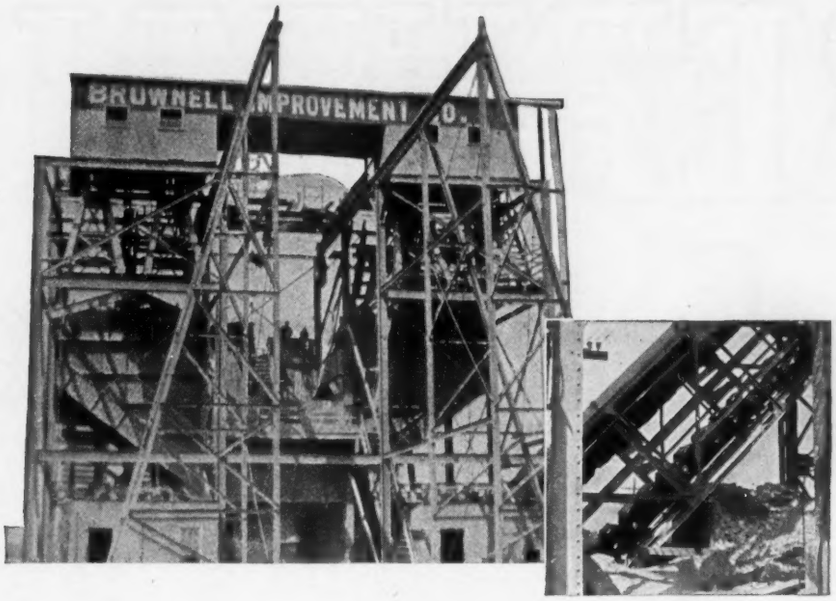

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At Thornton, Ill., the Brownell Improvement Co. operates this conveyor in a stone quarry. It elevates about 1,000,000 tons of rock a year. Two years ago Mr. W. J. Black, the general superintendent, had the Alemite High Pressure Lubricating System put on it. Here is his story.

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Rounds—3/8"—1/2"—5/8"—3/4"—7/8"—1"
Squares—1/2"—1"—1 1/8"—1 1/4"

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We charge our Open Hearth Furnaces with cream of pig iron selected from production of two blast furnaces, and with choicest scrap selected from large production accumulated from our various departments.

(2)—We Operate Our Own Open Hearth Furnaces—

Thus we are able to absolutely control accuracy of metal.

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(4)—We Do Our Own Rolling—

Therefore we can accept your orders and make shipment, knowing that your steel is "*Donner*" *Quality* through and through.

(5)—Our Excellent Organization and Facilities—

enable us to produce steel averaging lower in sulphur content, than is possible in many plants

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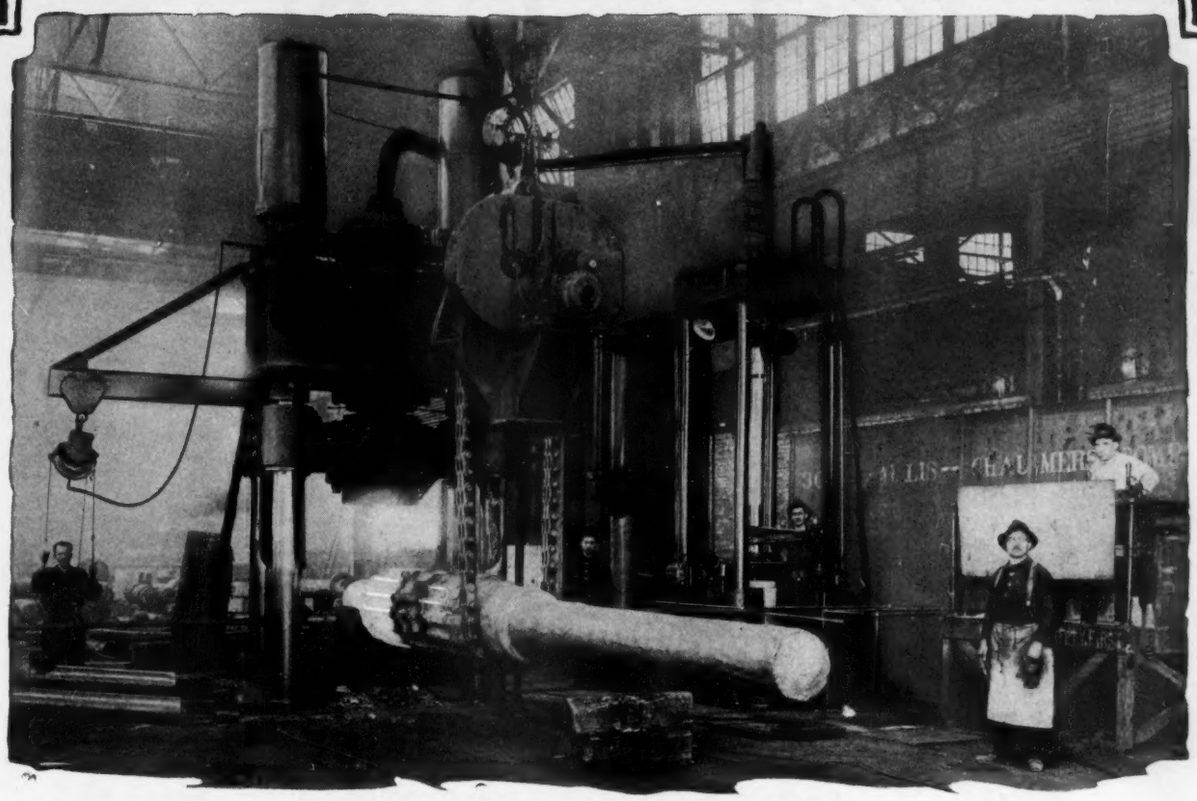

Heavy Forgings of Carbon-Vanadium Steel

FOR about ten years, the Allis-Chalmers Manufacturing Company, Milwaukee, has been meeting exacting requirements with heavy forgings of Carbon-Vanadium Steel.

Owing to the superior test results of Carbon-Vanadium, the United States Navy has in a number of instances, permitted this company to furnish shaft forgings of Carbon-Vanadium instead of the 3½% nickel steel for which the Navy specifications called.

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Without quenching and tempering, Carbon-Vanadium shows minimum yield point of 60,000 pounds, tensile strength of 90,000 pounds, elongation of 20% and reduction of area of 40%. Its freedom from segregation, and its excellent forging and machining qualities made it an ideal steel for heavy forgings. Write for complete information.

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We can roll plates up to 195" wide,—a feat that cannot be duplicated by anyone else.

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The deciding word in the *SHEET METAL SHOP*

Inland Sheets

are soft and workable

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insures longer life

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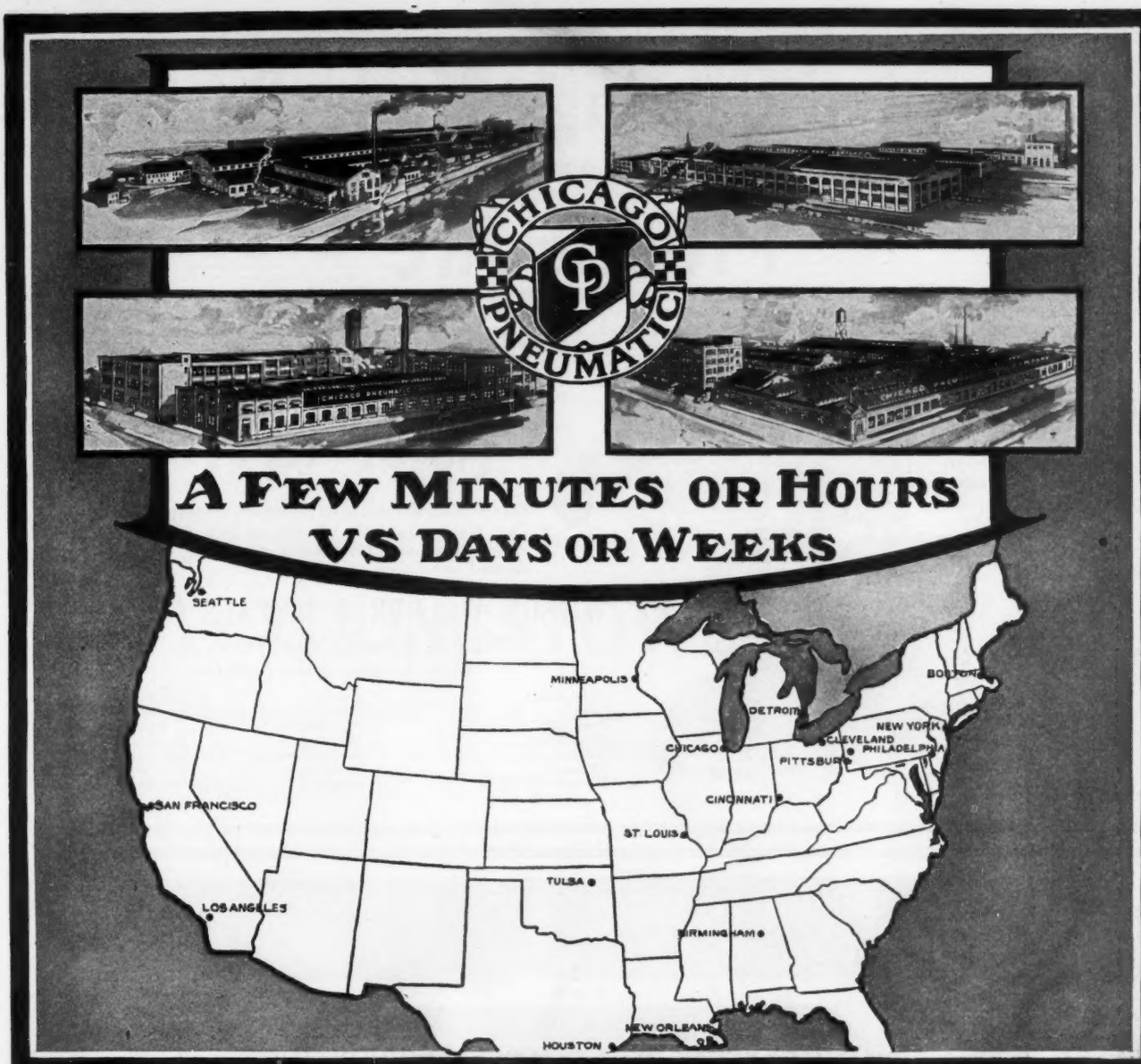

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Chicago Pneumatic Air Compressors
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J-123

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and make-overs are saved by using

WILSON Plastic-Arc SYSTEM

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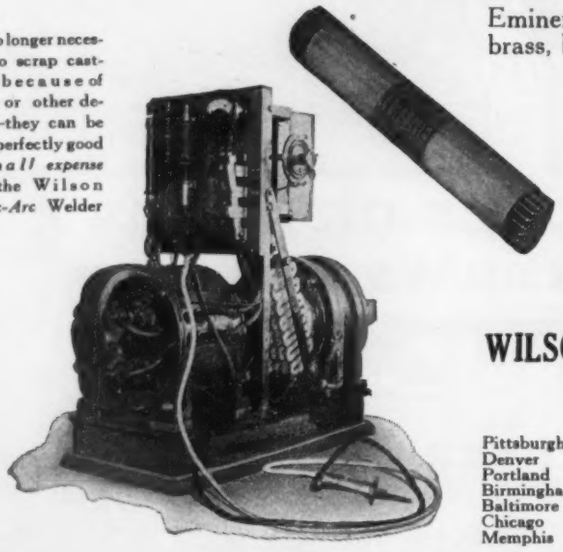
It is no longer necessary to scrap castings because of cracks or other defects—they can be made perfectly good *at small expense* with the Wilson *Plastic-Arc* Welder



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These mills have been operating over twenty years to insure an ample supply of high-grade tubes for Babcock & Wilcox boilers. The same careful selection of raw materials, close supervision of manufacture, rigid final inspection and promptness in deliveries are followed whether the tubes are made on outside order or for Babcock & Wilcox boilers.

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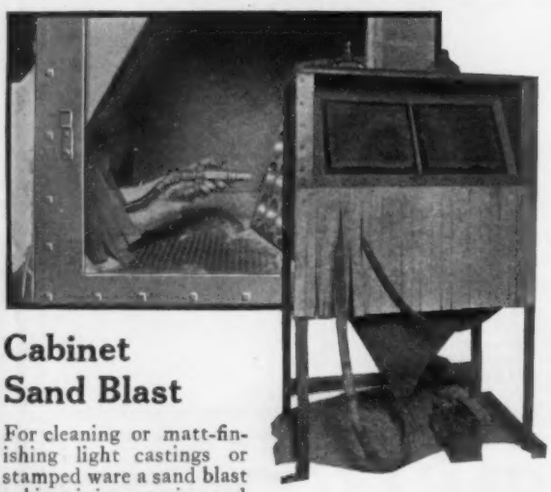

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For cleaning or matt-finishing light castings or stamped ware a sand blast cabinet is inexpensive and very practical. It will also pay for itself on fragile work and special jobs in connection with larger sand blast installations.

It offers the operator clear vision and protection from dust and sand the same as our larger installations.

Work is admitted through a door at either end of the cabinet, and lighted by two large protected electric lights built into the ceiling.

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Cars for industrial companies to run on all public lines.
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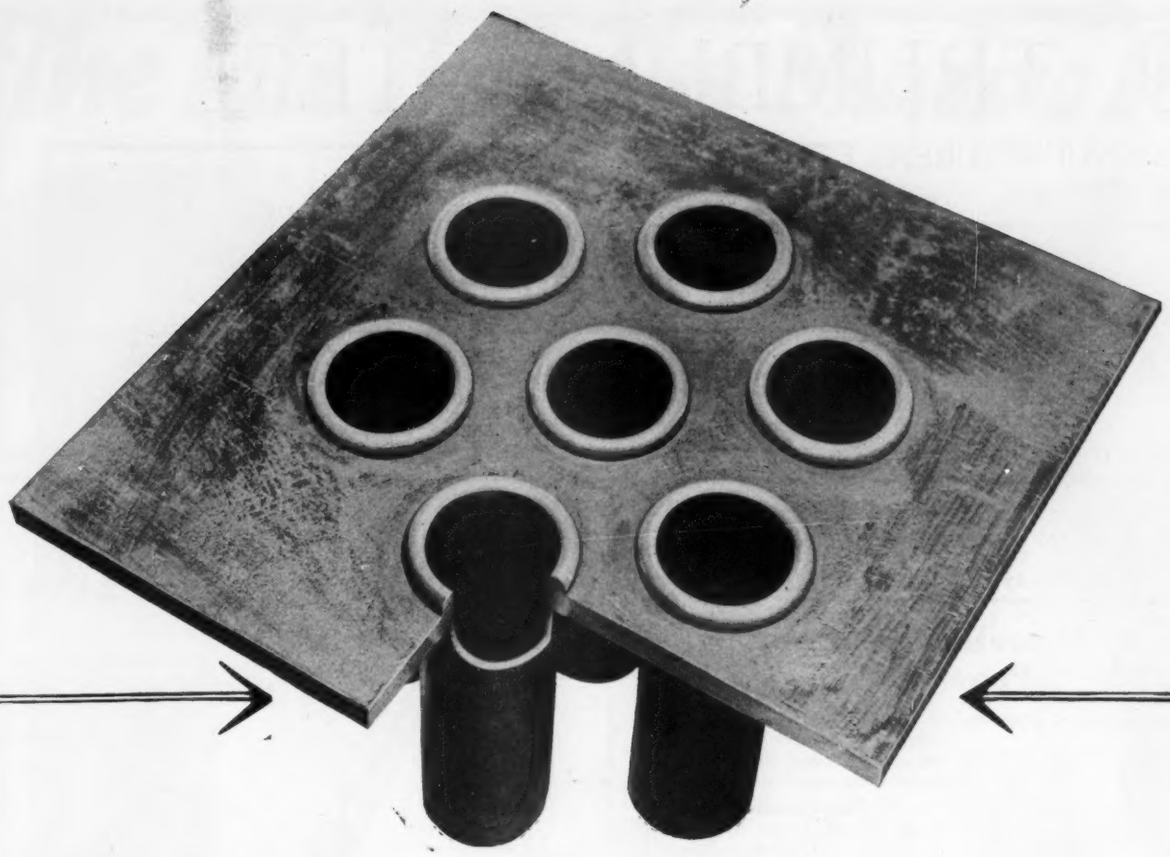

An important part of Boiler Tube Service is in the tube sheet

There it is determined whether the tube is made to fill the job satisfactorily. "SHELBY" Seamless Boiler Tubes are made with the particular qualities in mind that make for better service in the tube sheet. They must represent a high standard of accuracy in diameter, gage, length—they must stand up under repeated rolling, bead smoothly, and have ample ductility, yet adequate strength and stiffness to hold tight in the tube sheet.

Bulletin No. 16 will be found of interest. Sent free upon request.

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GENERAL SALES OFFICES: FRICK BUILDING
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"SHELBY" BOILER TUBES

THE TRUMBULL STEEL CO.

MANUFACTURERS OF

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Blue, Black and Galvanized SHEETS
Tin Mill Black, TIN PLATE
ELECTRICAL SHEETS, Etc.

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Easy to Operate, Quick Acting, Powerful

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90% Steel
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Let us figure how much an INDUSTRIAL can save for you.

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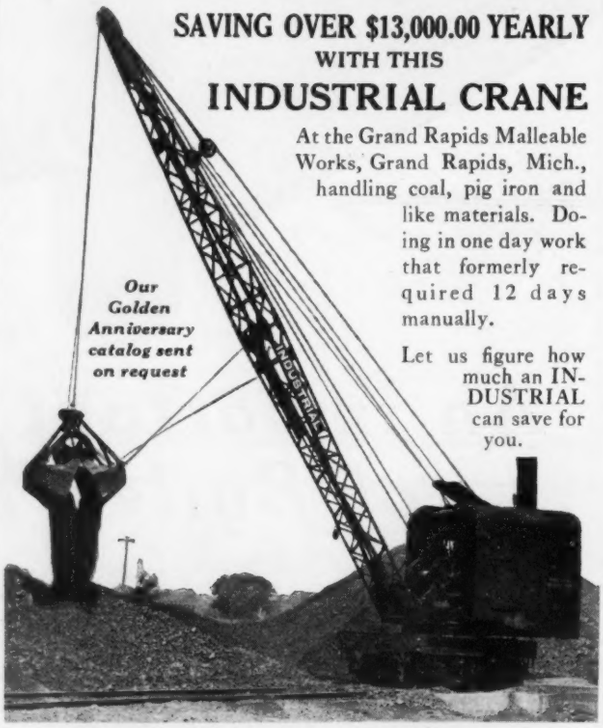

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Economical and Efficient for All Kinds of Sand Mixtures

The Simpson Mixer will also prepare daubing for lining furnaces, ovens, cupolas, etc. Has automatic discharge. Made in four sizes.

The Simpson Mixer will give you an unusually large measure of service at the lowest cost.

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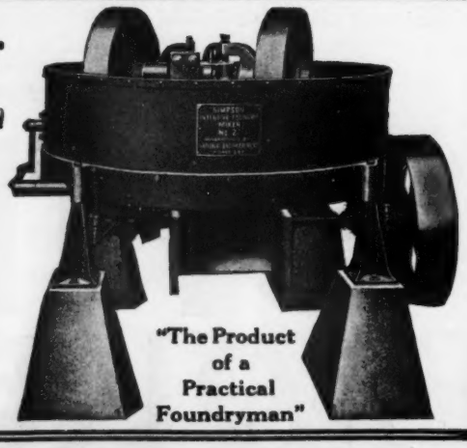

"The Product of a Practical Foundryman"

NATIONAL ENGINEERING CO.
Machinery Hall Bldg. 549 W. Washington St. CHICAGO, ILL.

The Tale That The Shadow Tells

—bolt threads produced in new way have accuracy of .0005″

IF YOU would know the accuracy of bolt threads, let the comparator project their image on the chart, greatly magnified.

Then the truth will come out.

The Empire *New Process* bolt has a thread accuracy of .0005″ — as smooth and clean as a glazed surface.

It possesses almost unbelievable strength—the nut is not made that can strip its threads.

A special addition to the factory has been erected and equipped to produce the *New Process* Bolt.

Samples are available now, for testing and comparing. Sent upon request.

At left: ordinary thread— Below: Comparator photograph.

At right: Empire New Process Thread — Below: Comparator photograph.

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Turn your wire specialty and spring problems over to us in your own economy. Our specialties backed by over thirty years of experience.

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CLEVELAND, OHIO
Branch Offices—Conway Bldg., Chicago, Ill., Garfield Bldg., Detroit, Mich.

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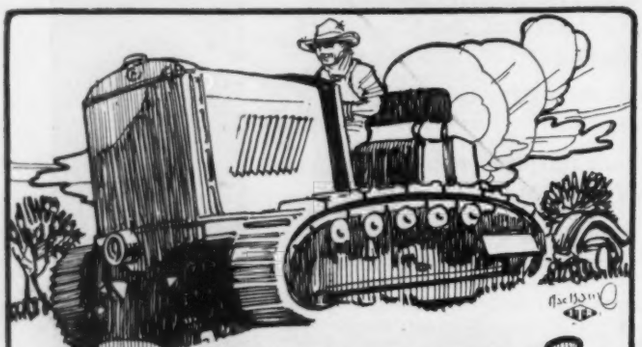

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Whether for the hardest kind of service, or for any other purpose, our specialty is *"Anything in Springs"*.

Our 40 years of experience in solving spring problems is your guarantee of utmost satisfaction.

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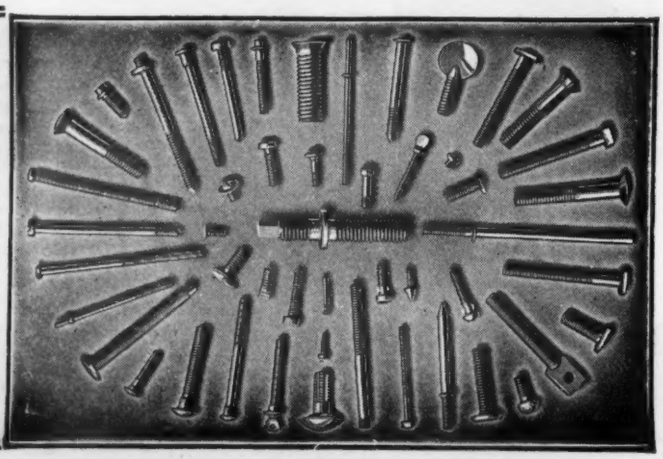
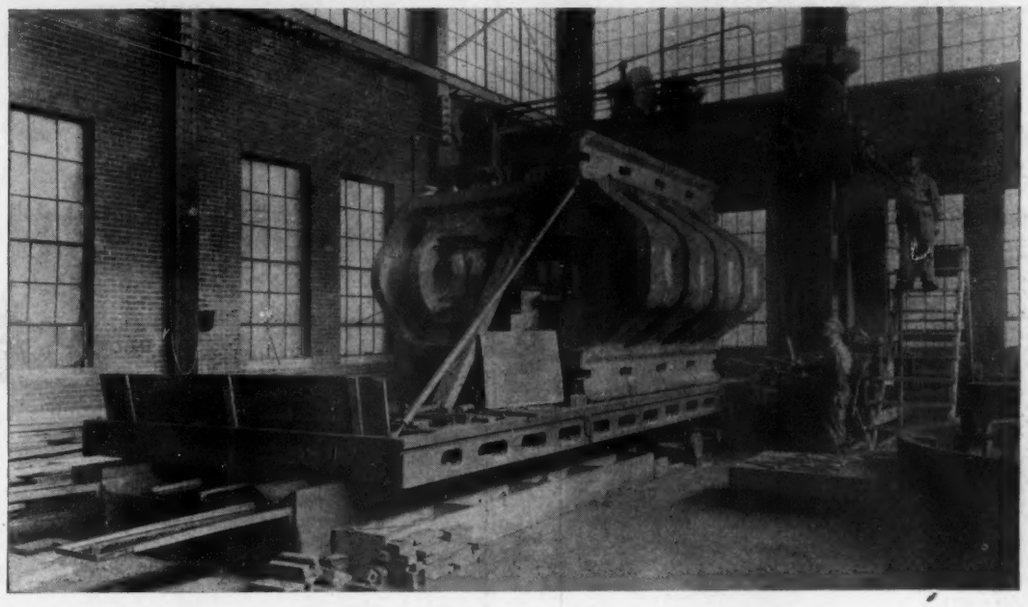
When in the market, write us for an estimate on your requirements stating the quantity desired and a prompt estimate will be sent you.

THE PROGRESSIVE MFG. CO.
TORRINGTON, CONN., U. S. A.

The illustration indicates a few of the many special parts that we have developed for other manufacturers.





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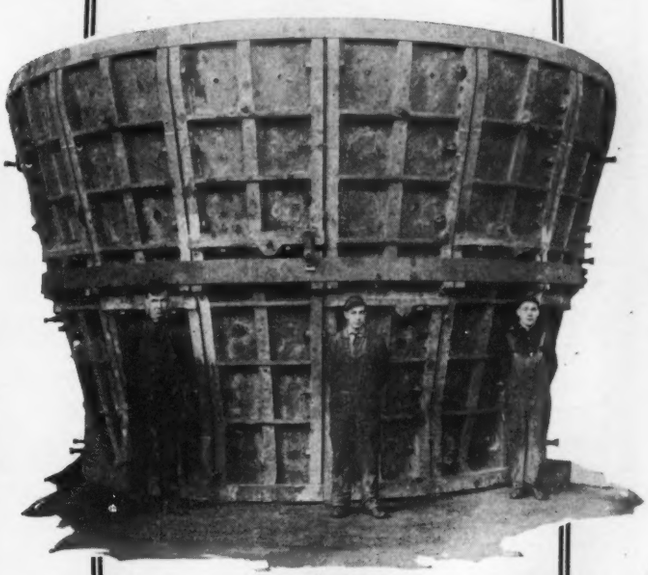
ROLLING MILL EQUIPMENT

BLAST FURNACE CASTINGS

HYDRAULIC MACHINERY

The illustrations will give you a comprehensive idea of our capacity for large work. We have facilities for producing iron and steel castings weighing up to 60 tons each. We can plane castings up to 15' width, and bore castings up to 25' diameter.



Blast Furnace Jacket

This jacket is of cast iron construction. It consists of 24 sections—and is 25' in diameter at the top and 20' at the bottom. Total weight, 300 tons.

Birdsboro Steel Foundry & Machine Co.

BIRDSBORO, PA.

New York Office: 90 West St., New York, Room 1710.
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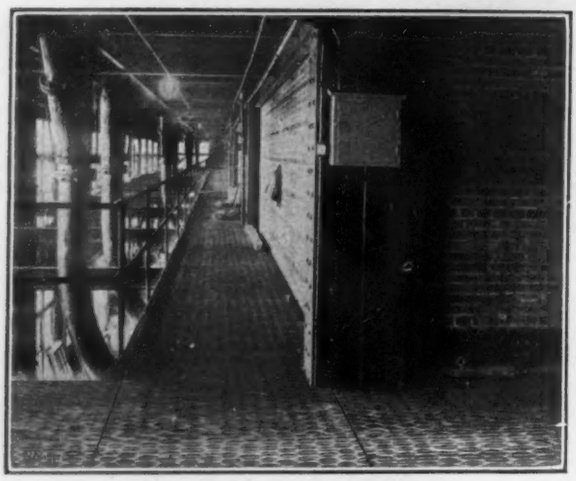
TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING



The Safe Metal Flooring

You cannot slip, on a floor of **Irving Subway**—its foot-gripping quality is a permanent feature. Time does not destroy or impair this non-slipping quality. Acres of **Irving Subway,** installed years ago in New York City streets, exposed to the daily traffic of hundreds of thousands of feet, is today as safe and comfortable to walk upon —as non-slipping—as the day it was laid. Wherever you want a surface that is safe and comfortable to walk or work or wheel upon, use **Irving Subway.** Let us send Catalog 4A32.

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ABSOLUTELY NON-SLIPPING ALWAYS

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seamless and welded

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Rolls
sand and chilled

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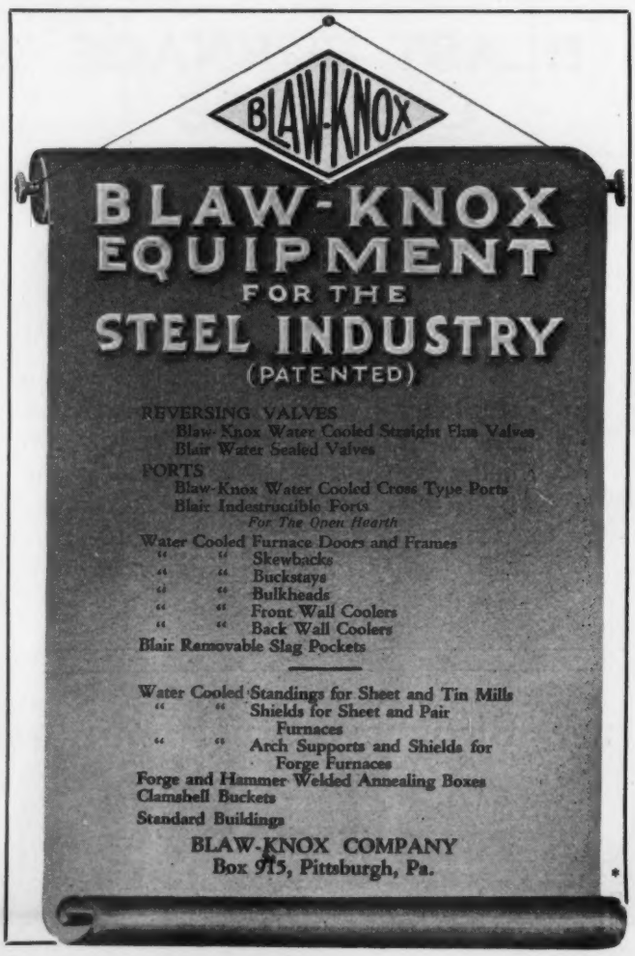
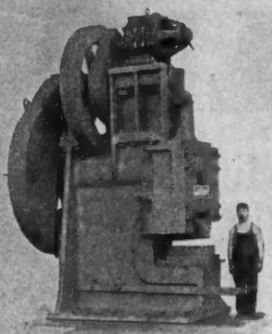
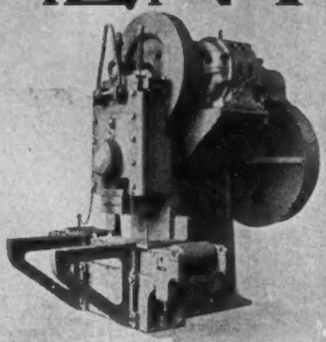


SOME UNITED EQUIPMENT



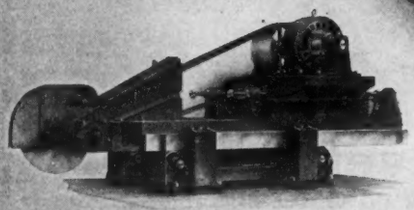
No4 VERTICAL SHEAR

16"X20" COLD STRIP MILLS

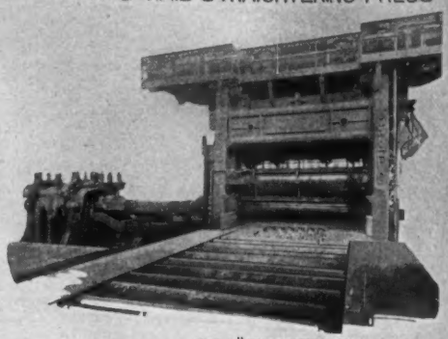


No3 RAIL STRAIGHTENING PRESS

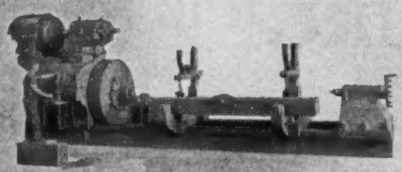
ANNEALING BOX



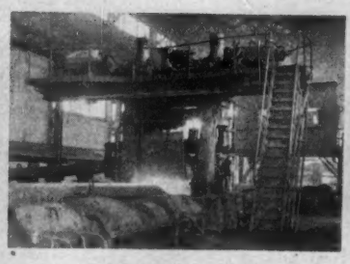
No300 SLIDING FRAME SAW



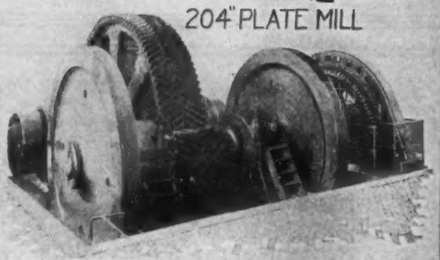
204" PLATE MILL



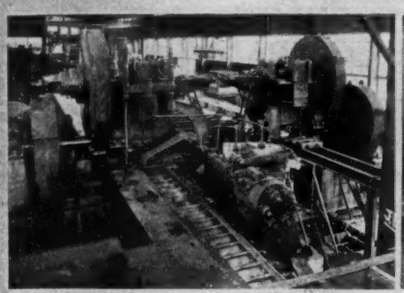
42" HEAVY DUTY ROLL LATHE



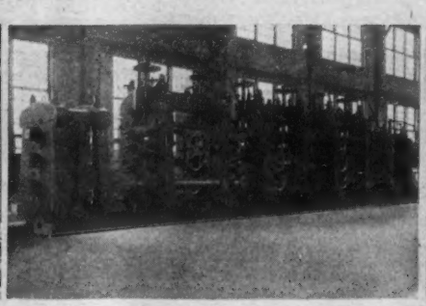
36" BLOOMING MILL



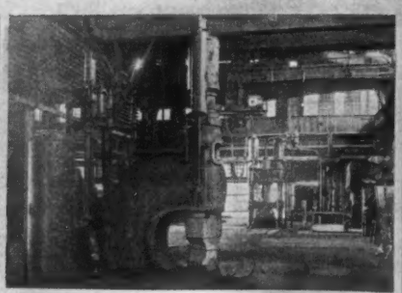
28" SHEET MILL DRIVE



10"X10" BLOOM SHEARS & GAUGE



18" MERCHANT MILLS



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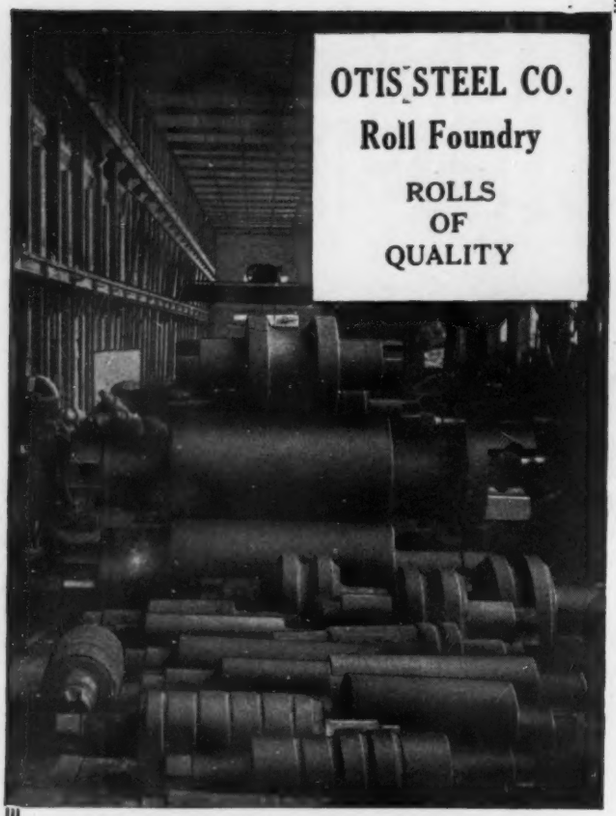

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Made to suit Mill Conditions to reduce Mill Costs.

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Great Strength
Long Service
Less Dressing

Delivery–Prompt

THE OTIS STEEL CO., Cleveland, Ohio

Makers of Steel Castings from 1 lb. to 150,000 lbs. each. Rolled Steel Plates and Blue Annealed Sheets

1897 **CHAMBERSBURG** 1923

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STEAM HAMMERS
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TRIMMING PRESSES (POWER AND HYDRAULIC TYPES)
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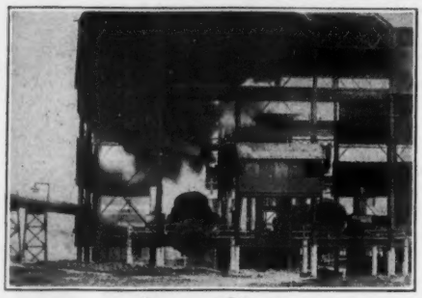
65-Ton Metal Transfer Car

Large Steel Ladles,—Hot Metal, Bin Filling and Ore Scale Cars.

Ingot and Open Hearth Charging Cars, Metal Mixers.

Open Hearth Furnaces and Converters

We shall be glad to send full details.



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and all General Castings, subject to severe wear

"Will It Perform as Well as Adamite?"

Mill men, all over the country, have found the answer to this question in the profitable Performance "Adamite" is giving them in their mills for all of the above uses—NO MATERIAL WILL PERFORM AS WELL AS ADAMITE.

ADAMITE gives a greater value, measured by results shown on the cost sheet.

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Don't be misled by—"Just as good as ADAMITE"
Nothing has equalled "IT" Yet.

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PHOENIX·STEEL·ROLLS

CARBON Steel for Bloomer and Roughing Rolls subjected to extra heavy reductions.

'PHOENIX B' Chrome Carbon Steel for Bloomers and Roughing having moderately heavy reductions.

'PHOENIX A' Chrome Carbon Steel is being used for Cross-Shoulder Tie-Plate finishing. We suggest use of this Alloy for light Roughing Intermediates and heavy finishing work.

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Rolling Mill Jim Says—
Say Fellas;
Don't forget that Better Rolls mean Better Steel—and that HUBBARD ROLLS can't be beat.
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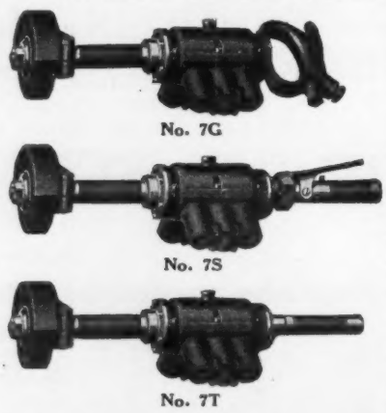
EAST CHICAGO, IND.
All Kinds of Iron and Steel Rolls and Steel Castings

"CLECO" Portable Ball Bearing Emery Grinders

Made in 2 Sizes—No. 7 and No. 8



No. 7 Grinders are fitted with "Three" styles of Handles as illustrated and 4" or 6" Wheel Guards. Weight 12 lbs. Speed 4600. Adapted for Light or Medium grinding.

No. 8 Grinders are same design as the No. 7 but are heavier and more powerful—same choice of Handles. Wgt. 21 lbs., Speed 3600, fitted with 8" Wheel Guards. Adapted for heavy grinding.

The Crank Connecting Rods and Arbor Shaft of Cleco Grinders are mounted on Ball Bearings, eliminating all Studnuts, Caps and Toggles.

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Cleveland, Ohio, U. S. A.
Branch offices in all the large cities

Cramped Quarters no Hindrance

"Strong for Work," this unbreakable, non-slip tool is unsurpassed for use on all pipe work. ***WILLIAMS' "FALCON CHAIN AND FITTING WRENCH"*** is particularly serviceable on flanges, R & L hand fittings, coils, etc., and is proving an invaluable asset to fitters where handicapped by cramped working quarters.

The removal jaw is reversible, end for end, and is tempered for file sharpening. Every chain link is tested, while all parts of the tool are interchangeable, replacements always carried in stock.

It can be had with either flat or cable chain and is made in various sizes from 13½ inches to 58½ inches in length.

Let us send you all the particulars.
Also our catalog.

J. H. WILLIAMS & CO.

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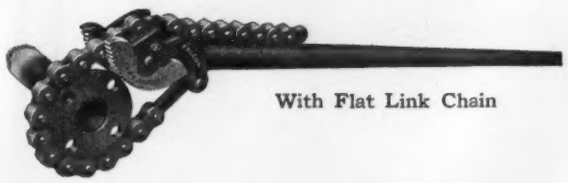
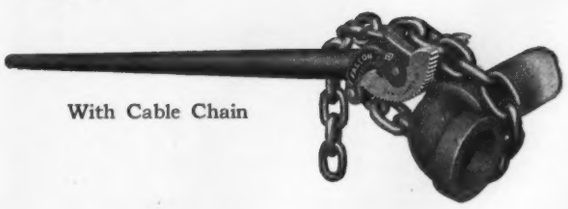


With Flat Link Chain

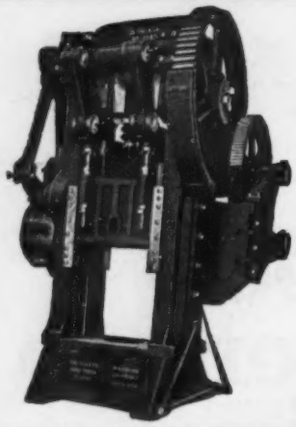


With Cable Chain

WILLIAMS

SUPERIOR DROP-FORGED TOOLS

"FALCON"
CHAIN PIPE AND FITTING WRENCH



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The wide range of sizes covers every requirement from the small tin cup to crown fenders, rear tonneaus and the most difficult forms.

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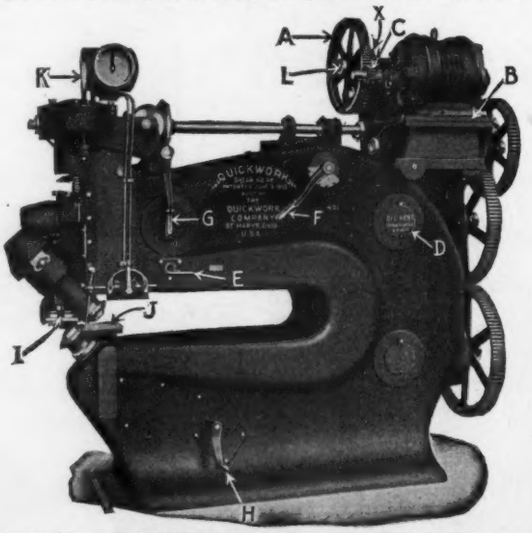

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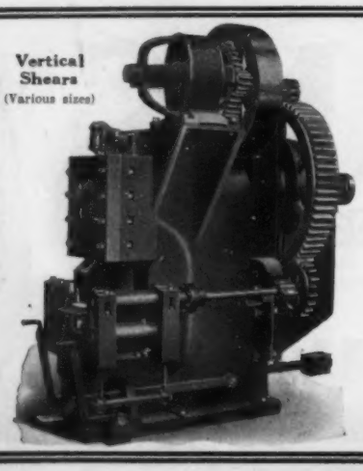

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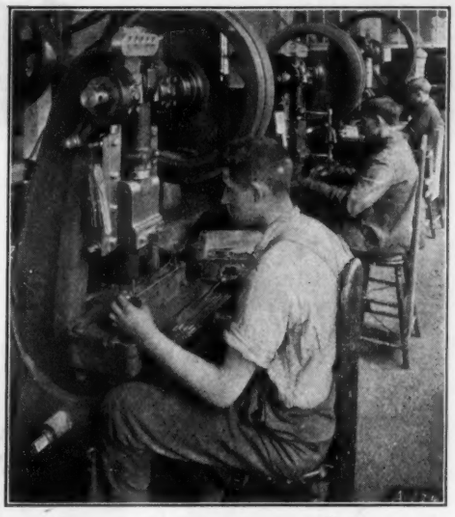
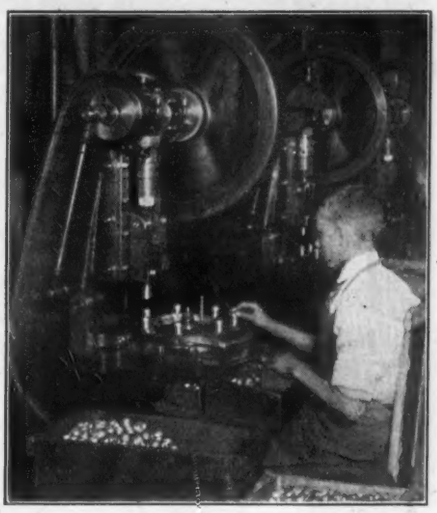


A " BLISS " No. 19 Inclinable Power Press bending handles for bread knives

For Every Requirement



A " BLISS " No. 19 Inclinable Power Press making toy bells

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THEY ARE FOUND in every field where sheet metal work is used. They are adapted to the manufacture of agricultural implements, brass goods, clocks, electrical goods, hardware, enamel and aluminum ware, steel barrels, horseshoes, kitchen utensils, lamps and lanterns, tinware, expanded metal lath, metal furniture, typewriters, tractor and automobile parts, steel railroad cars, and numerous other staple and special lines.

Photographs by courtesy of our customers.

A line of " BLISS " Adjustable Bed Presses in an oil stove factory

A line of " BLISS " Inclinable Power Presses making various automobile accessories

Bliss for Machinery

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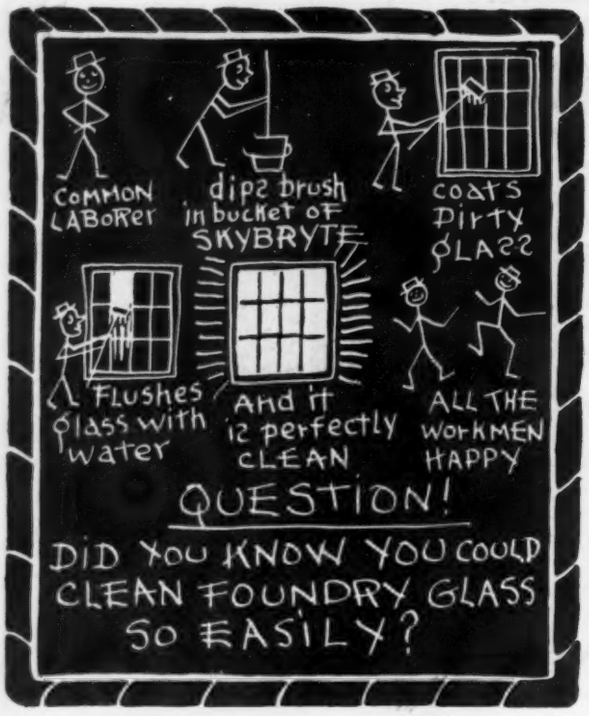
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coats Dirty GLASS
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And it is perfectly CLEAN
ALL THE workmen HAPPY
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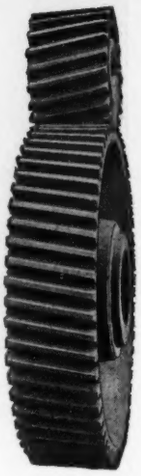

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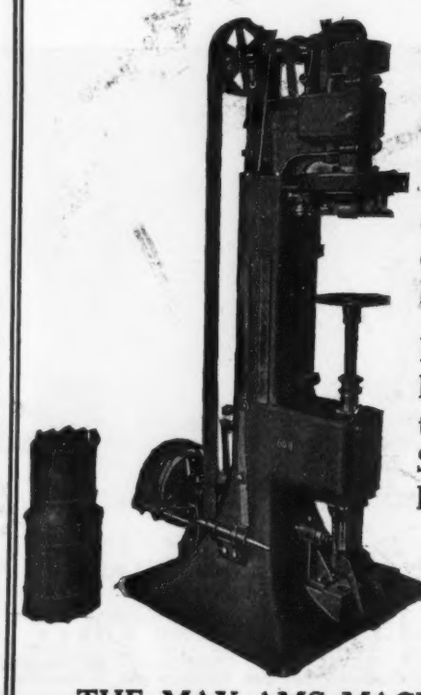

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No Hand Levers Used to Operate Seaming Rollers.

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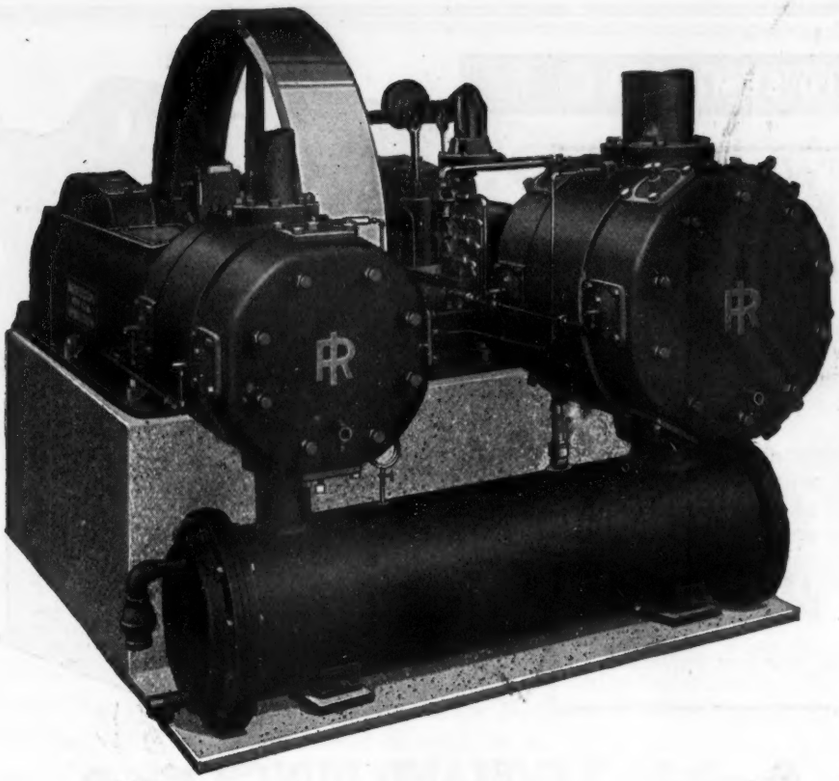

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Ingersoll-Rand inlet and discharge plate valves operate automatically and entirely independent of any moving valve gear. Large free port and lift openings, adjustment of valve spring tension so as to give the least possible resistance to the intake or discharge of air, insure high compression efficiency.

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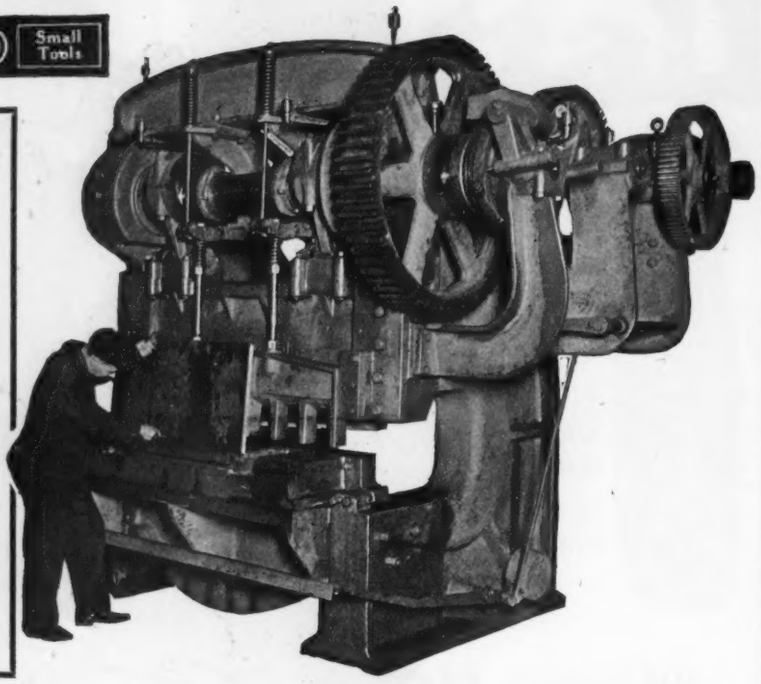
Take a look at the massive, rugged construction of the machine illustrated and add to this the fact that it shears accurately up to its maximum capacity and you'll get an idea of what we mean by Shear performance.

May we send you our bulletin?



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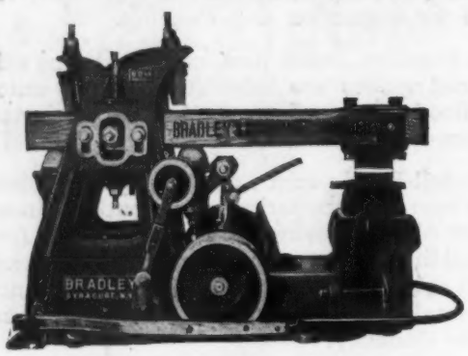

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equipped for either belt or motor drive

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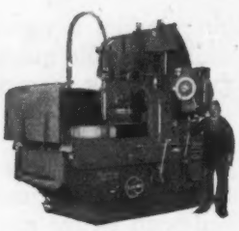
As Used on the
NEW No. 27R BLANCHARD VERTICAL SURFACE GRINDER



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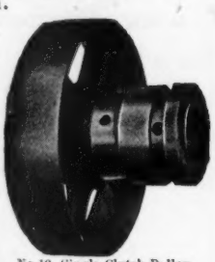
Special constructions similar to the above are being worked out in our Engineering Department daily.

WE CAN SOLVE YOUR CLUTCH PROBLEMS.



No 10. Single Clutch Pulley

No. 6 Double Clutch, Exterior

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Let us figure on your requirements.

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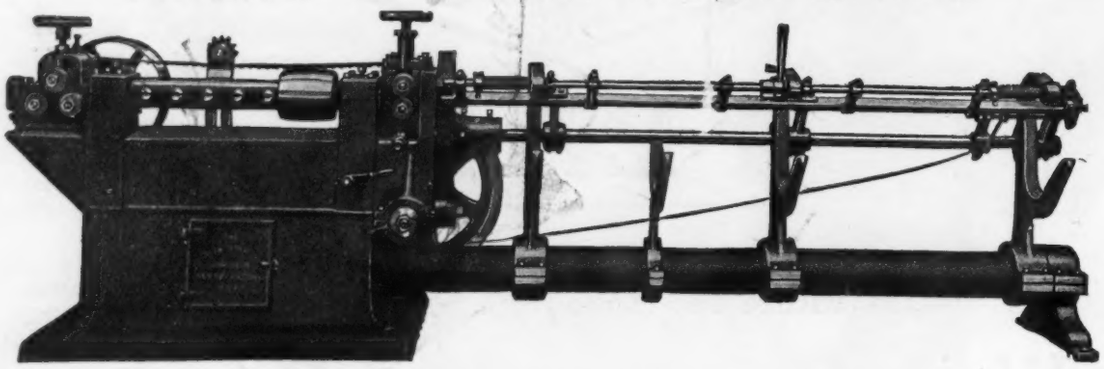
MONESSEN, PA. **PITTSBURGH DISTRICT**

General Founders and Machinists

AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINES



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Simple in adjustment and operation, capable of large production, and standing up to their work *permanently*, are some of the characteristics of Shuster Machines.

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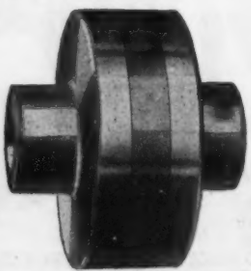
Formerly John Adt & Son ***Catalog J?*** **Established 1866**



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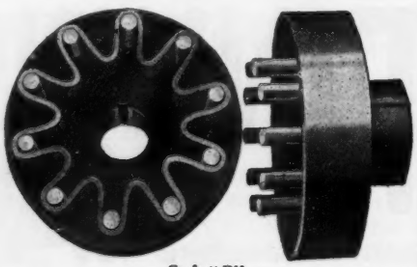

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Spur Gear Speed Reducers
Flywheels—Rope Sheaves
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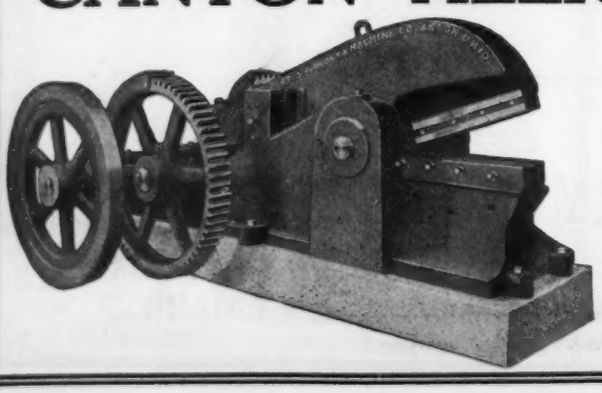
CANTON ALLIGATOR SHEARS



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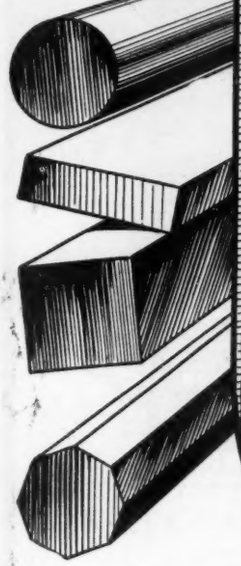

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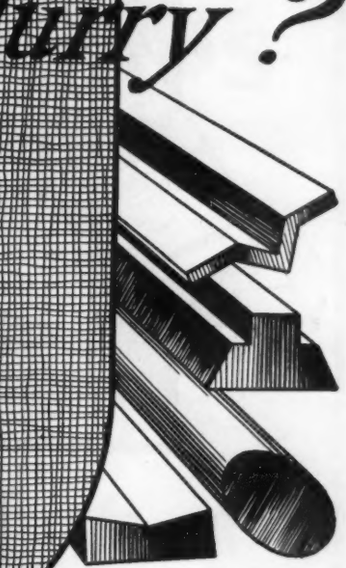

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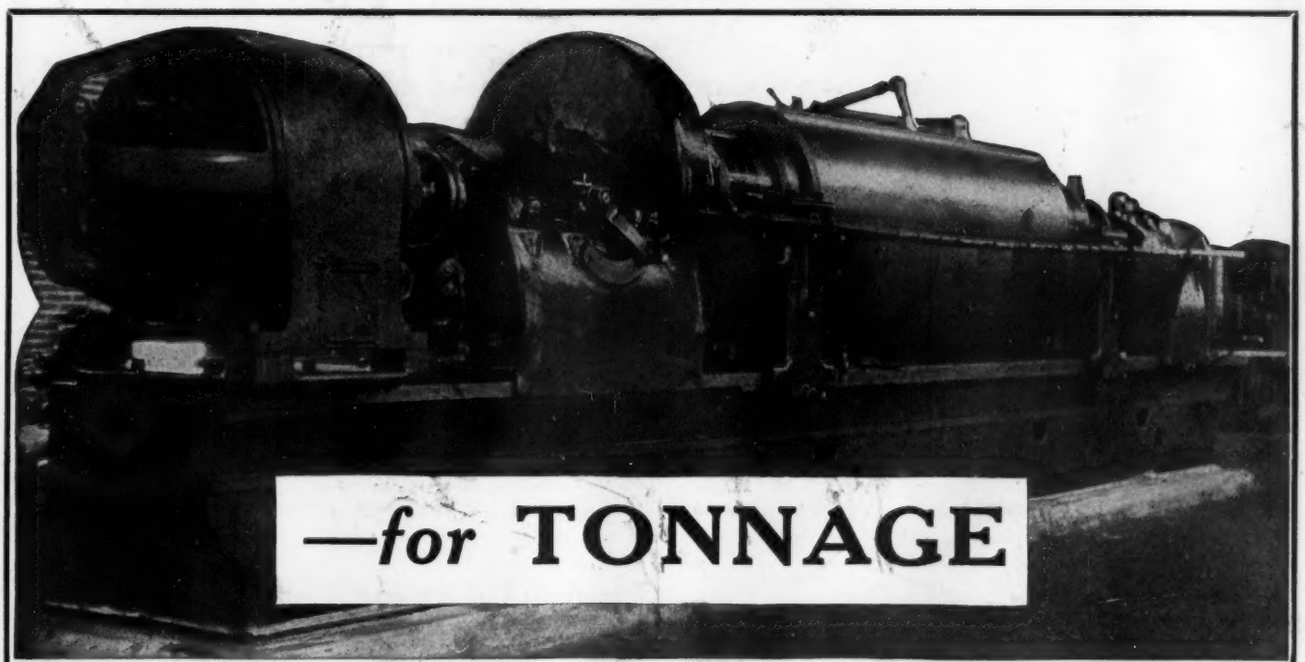

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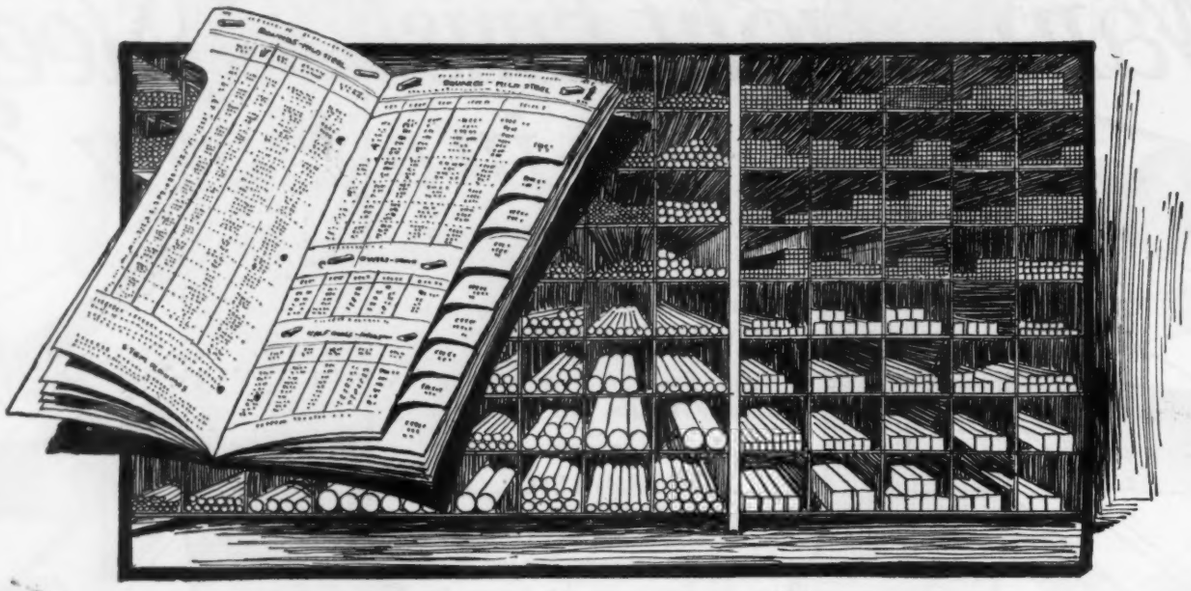

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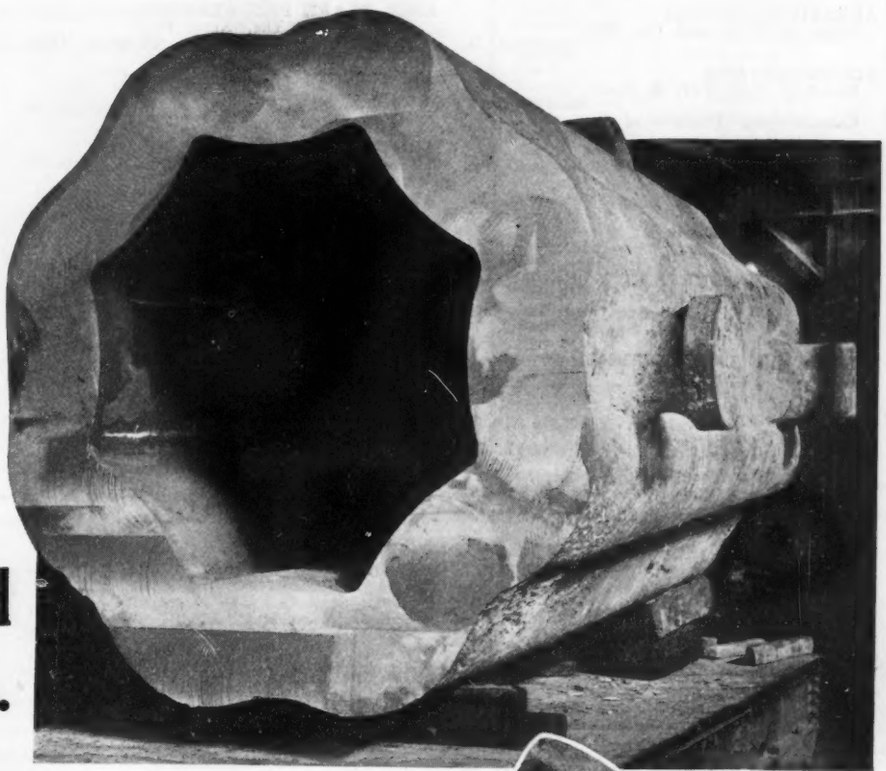
We make special designs of any size or weight desired.
May we furnish your requirements?



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BARRELS (Steel)
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BARS (Alloy)
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

BARS (Angle)
Hyman-Michaels Co., 122 Peoples Gas Bldg., Chicago, Ill.

BARS (Concrete Reinforcements)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Pardee Steel Corp., Perth Amboy, N. J.
Pollak Steel Co., The, Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Truscon Steel Co., 615 Wayne St., Detroit, Mich.

BARS (Iron)
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Lockart Iron & Steel Co., Pittsburgh, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pardee Steel Corp., Perth Amboy, N. J.
Penn Iron & Steel Co., Creighton, Pa.

BARS (Steel)
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Bliss & Laughlin, Inc., Harvey, Ill.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Warehouse Co., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Pardee Steel Corp., Perth Amboy, N. J.
Pollak Steel Co., The, Cincinnati, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Valley Rolling Mills, Inc., 120 Broadway, New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

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Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Phoenix Iron Co., 20 South 15th St., Philadelphia, Pa.
Pollak Steel Co., The, Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Snead Architectural Iron Works, Louisville, Ky.
Valley Rolling Mills, Inc., 120 Broadway, New York, N. Y.

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Wellman Bronze Co., The, 6017 Superior Ave., Cleveland, O.

BEARINGS (Journal)
Keystone Bronze Co., 39th St., Pittsburgh, Pa.

BEARINGS (Roller)
Hyatt Roller Bearing Co., Newark, N. J.

BELT FASTENERS (Metal)
Bristol Co., The, Waterbury, Conn.

BELT LACING
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BELT LACING (Leather)
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BELTING (Chain)
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Vaughn Machinery Co., The, Cuyahoga Falls, O.

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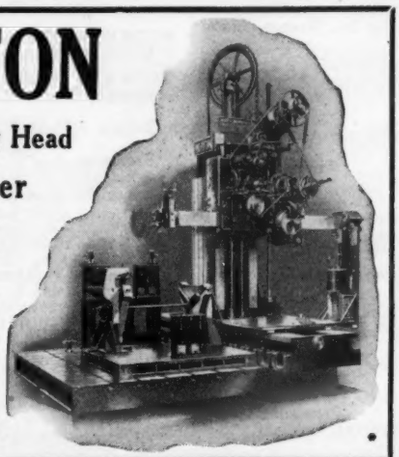

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Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
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Inland Steel Co., First National Bank Bldg., Chicago, Ill.
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McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Pardee Steel Corp., Perth Amboy, N. J.
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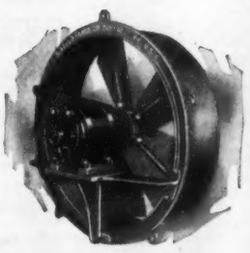

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Valley Mould & Iron Corp., Sharpsville, Pa.

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Evansville Aluminum & Brass Casting Co., Evansville, Ind.
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Keystone Bronze Co., 39th St., Pittsburgh, Pa.
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Turner & Seymour Mfg. Co., Torrington, Conn.

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Blackwood Electric Steel Corp., Parkersburg, W. Va.
Crucible Steel Casting Co., The, Almira and W. 84th St., Cleveland, O.
Eastern Steel Castings Co., Newark, N. J.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Milwaukee Steel Foundry Co., 101-121 S. Walter St., Milwaukee, Wis.
Pelton Steel Co., Milwaukee, Wis.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Racine Steel Castings Co., Racine, Wis.

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American Castings Co., Corry, Pa.
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Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdy. & Machy. Co., Birdsboro, Pa.
Bonnot Co., Canton, O.
Buffalo Foundry & Machine Co., 1543 Fillmore Ave., Buffalo, N. Y.
Cascade Foundry Co., Erie, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Cyclops Foundry Co., Union Bank Bldg., Pittsburgh, Pa.
DuBois Iron Works, 800 North Brady St., DuBois, Pa.
Federal Signal Co., Albany, N. Y.
Lake Shore Engine Works, Marquette, Mich.
Link-Belt Co., Chicago, Ill.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., West Homestead, Pa.
Midvale Co., The, 4320 Wissahickon Ave., Philadelphia, Pa.
Monessen Foundry & Machine Co., Monessen, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
St. Louis Malleable Casting Co., 7701 No. Conduit Ave., St. Louis, Mo.
Smith Gas Engineering Co., Dayton, O.
Standard Engrg. Co., Ellwood City, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CASTINGS (Malleable)
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Malleable Castings Association, 1900 Euclid Ave., Cleveland, O.
Arcade Malleable Iron Co., Muskegon Ave., Worcester, Mass.
Belle City Malleable Iron Co., Racine, Wis.
Columbus Malleable Iron Co., Columbus, O.
Danville Malleable Iron Co., Danville, Ill.
Dayton Malleable Iron Co., Dayton, O.
Decatur Malleable Iron Co., Decatur, Ill.
Frazer & Jones, Syracuse, N. Y.
Illinois Malleable Iron Co., 1801 Diversey Blvd., Chicago, Ill.
Iowa Malleable Iron Co., Fairfield, Iowa.
Kalamazoo Malleable Iron Co., Kalamazoo, Mich.
Lakeside Malleable Castings Co., Racine, Wis.
Link-Belt Co., P. O. Box 346, Indianapolis, Ind.
Marion Malleable Iron Wks., Marion, Ind.
Moline Malleable Iron Co., St. Charles, Ill.
Newark Malleable Iron Works, Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Northwestern Malleable Iron Co., Milwaukee, Wis.
Peoria Malleable Castings Co., Peoria, Ill.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Rockford Malleable Iron Works, Rockford, Ill.
Ross-Meehan Foundries, Chattanooga, Tenn.
St. Louis Malleable Castings Co., 7701 No. Conduit Ave., St. Louis, Mo.
Symington, T. H., Co., The, Lincoln Park Works, Rochester, N. Y.
Temple Malleable Iron & Steel Co., Harrison Bldg., Philadelphia, Pa.
Vermillion Malleable Iron Co., Hoopeston, Ill.
Wanner Malleable Castings Co., Hammond, Ind.
Warren Tool & Forge Co., 225 Griswold St., Warren, O.
Wisconsin Malleable Iron Co., Milwaukee, Wis.
Zanesville Malleable Co., Zanesville, O.

CASTINGS (Manganese Steel)
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

CASTINGS (Monel Metal)
Pittsburgh Valve, Foundry & Construction Co., 26th St. & A. V. R. R., Pittsburgh, Pa.

CASTINGS (Semisteel)
Ajax Iron Works, Corry, Pa.
American Castings Co., Corry, Pa.
Buffalo Foundry & Machine Co., 1543 Fillmore Ave., Buffalo, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS (Steel)
Allegheny Steel Co., Pittsburgh, Pa.
American Adamite Co., The, 311 Oliver Bldg., Pittsburgh, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Blackwood Electric Steel Corp., Parkersburg, W. Va.
Chicago Steel Foundry Co., 37th and Kedzie Ave., Chicago, Ill.
Commercial Steel Castings Co., The, Marion, O.
Crucible Steel Casting Co., The, Almira and W. 84th St., Cleveland, O.
Duquesne Steel Foundry Co., Pittsburgh, Pa.
Eastern Steel Castings Co., Newark, N. J.
Falk Corporation, The, Milwaukee, Wis.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Federal Steel Foundry Co., Chester, Pa.
Hubbard Steel Fdry. Co., E. Chicago, Ind.
Mackintosh-Hemphill Co., Pittsburgh Pa.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Mesta Machine Co., West Homestead, Pa.
Midvale Co., The, 4320 Wissahickon Ave., Philadelphia, Pa.
Milwaukee Steel Foundry Co., 101-121 South Water St., Milwaukee, Wis.
Ohio Steel Foundry Co., The, Springfield, O.
Otis Steel Co., Cleveland, O.
Pelton Steel Co., Milwaukee, Wis.
Racine Steel Castings Co., Racine, Wis.
Reading Steel Casting Co., Reading, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sharon Foundry Co., Sharon, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Stroh Steel Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
West Steel Castings Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CAST IRON PIPE
United States Cast Iron Pipe & Fdry Co., Burlington, N. J.

CASTORS (Plate Mill)—See PLATE CASTORS

CEMENT MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CEMENT (High Temperature)
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.
Savage Mountain Fire Brick Co., Frostburg, Md.

CEMENT KILNS (Rotary Liners and Brick)
Laclede-Christy Clay Products Co., St. Louis, Mo.

CENTER PLATES (Railroad)
Transue & Williams Steel Forging Corp., Alliance, O.

CENTRAL STATION EQUIPMENT
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

CHAIN DRIVES
Arcade Malleable Iron Co., Muskegon Ave., Worcester, Mass.
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.

CHAINS (Power Transmission)
Morse Chain Co., Ithaca, N. Y.

CHANNELS—See STEEL (Structural)

CHAPLETS
Champion Mch. & Forging Co., Cleveland, O.
Erdle Perforating Co., 171 York St., Rochester, N. Y.

CHARCOAL
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.

CHECKS (Time, Tool and Pay)
Matthews & Co., James H., 3942 Forbes St., Pittsburgh, Pa.
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

CHEMICALS
Ford, J. B., Co., The, Wyandotte, Mich.

CHISEL BLANKS
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, O.
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.
Merchant, George F., Co., 1434 S. Rockwell, Chicago, Ill.

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CHROME VANADIUM STEEL (Cold Drawn)
Union Drawn Steel Co., Beaver Falls, Pa.

CHROMIUM METAL
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CHUCKS
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CHUCKS (Lathe)
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CLEANER (Metal)
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CLEANING SPECIALTIES
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CLUTCHES
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Johnson, Carlyle, Machine Co., The, Manchester, Conn.

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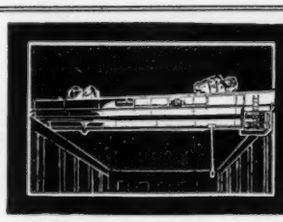

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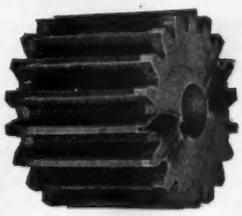

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Western Reserve Bldg., Cleveland, O.
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Oliver Bldg., Pittsburgh, Pa.
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Orton & Steinbrenner Co.,
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COKE (See COAL AND COKE)

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CONCRETE MIXERS—See MIXERS (Concrete)

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Mt. Vernon, O.
Cooper, C. & G., Co., Mt. Vernon, O.
Ingersoll-Rand Co.,
11 Broadway, New York, N. Y.

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Youngstown, O.

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Transue & Williams Steel Forging Corp.,
Alliance, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

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Electric Controller & Mfg. Co.,
Cleveland, O.

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Brown Hoisting Machinery Co.,
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Link-Belt Co., Chicago, Ill.

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New England Brass Co., Taunton, Mass.
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CRANES (Crawling, Tractor, Etc.)
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Wickliffe, O.

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CUTTING AND WELDING (Oxy-Aceteylene Process—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

CYANIDE POTS
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.

CYLINDERS (Acetylene)—See ACETYLENE IN CYLINDERS

CYLINDERS (Oxygen)—See OXYGEN IN CYLINDERS

CYLINDERS (Pressure)
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Harrisburg, Pa.
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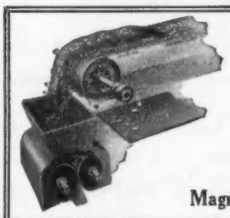

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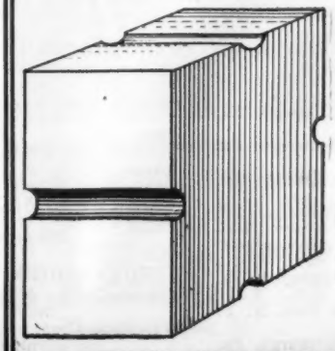

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6 East 44th St., New York, N. Y.
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co.,
11 Broadway, New York, N. Y.

DRILLS (Rock)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York, N. Y.
Ingersoll-Rand Co.,
11 Broadway, New York, N. Y.

DRIVES (Cut Herringbone Gears)
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

DRYERS (Sand, Coal, Ores, Chemical, Etc.)
Bartlett & Snow, C. O., Co., Cleveland, O.
Duff Patents Co., Inc.,
321 Union Trust Bldg., Pittsburgh, Pa.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELECTRIC HEATERS (for Rivets, Bolts, Drop Forgings, Rods)
American Car & Foundry Co.,
165 Broadway, New York, N. Y.

ELECTRIC HEATING APPARATUS
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

ELECTRIC TOOLS (Portable)—See TOOLS (Portable Electric)

ELECTROLYTIC CELLS
Electrolabs Co., The,
2635 Penn Ave., Pittsburgh, Pa.

ELECTROLYTIC OXYGEN AND HYDROGEN GENERATORS
Electrolabs Co., The,
2635 Penn Ave., Pittsburgh, Pa.

ELEVATOR GUIDES
Union Drawn Steel Co., Beaver Falls, Pa.

ELEVATORS (Bucket)
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Co., Chicago, Ill.

EMERY WHEEL DRESSERS
Calder, Geo. H., Co.,
626 N. Prince St., Lancaster, Pa.

EMPLOYEE INSURANCE
Travelers Insurance Co., The, Hartford, Conn.

ENAMELING EQUIPMENT
Ferro Enamel Supply Co., The,
Cleveland, Ohio.

ENGINE LATHES—See LATHES (Engine)

ENGINEERS AND CONTRACTORS
Ferguson, H. K., Co., The,
6523 Euclid Ave., Cleveland, O.
Freyn, Brassert & Co.,
Peoples Gas Bldg., Chicago, Ill.
Hagan, George J., Co.,
Chamber of Commerce Bldg., Pittsburgh, Pa.
Kennedy, Julian,
Bessemer Bldg., Pittsburgh, Pa.
Laughlin, Alex, & Co.,
First National Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
McClure, Geo. W., Son & Co.,
Pittsburgh, Pa.
McKee, Arthur G., & Co.,
2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co.,
Union Bank Bldg., Pittsburgh, Pa.
Phoenix Bridge Co.,
20 South 15th St., Philadelphia, Pa.
Pittsburgh Valve, Fdry. & Construction Co.,
26th St. & A. V. Ry., Pittsburgh, Pa.
Smythe, S. R., Co., The, Pittsburgh, Pa.
Sutton-Abramsen Engrg. Co.,
Park Bldg., Pittsburgh, Pa.
Swindell, Wm., & Bros.,
Jenkins Arcade, Pittsburgh, Pa.

ENGINEERS (Consulting)
Amberg, W. E.,
438 Marquette Bldg., Chicago, Ill.
Ellis, Frank I.,
2127 Farmers Bank Bldg., Pittsburgh, Pa.
Freyn, Brassert & Co.,
Peoples Gas Bldg., Chicago, Ill.
Kennedy, Julian,
Bessemer Bldg., Pittsburgh, Pa.
McKee, Arthur G., & Co.,
2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co.,
Union Bank Bldg., Pittsburgh, Pa.
Perin, C. P., Marshall, S. M.,
1107 Broadway, New York, N. Y.
Shover, Barton R.,
424 Oliver Bldg., Pittsburgh, Pa.

ENGINEER, CONSULTING (By-Product Coke Oven and Gas Plants)
Koppers Co., The, Pittsburgh, Pa.

ENGINES (Diesel)
Falk Corporation, The, Milwaukee, Wis.

ENGINES (Gas)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York, N. Y.

ENGINES (Gasoline)
Bailey, Wm. M., Co.,
506 Bakewell Bldg., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co.,
7000 Central Ave., Cleveland, O.

ENGINES (Heavy Duty)
Mesta Machine Co., West Homestead, Pa.

ENGINES (Oil)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York, N. Y.
Ingersoll-Rand Co.,
11 Broadway, New York, N. Y.

ENGRAVERS (Steel and Copper Plate)
Wiggins, John B., Co.,
705 Peoples Gas Bldg., Chicago, Ill.

EXHAUSTERS (Gas)—See GAS EXHAUSTERS

EXPANDED AND PERFORATED METAL
McCalla, Harold, Co., The,
Beach St. and E. Columbia Ave.,
Philadelphia, Pa.

FANS (Heating and Ventilating)
Buffalo Forge Co.,
490 Broadway, Buffalo, N. Y.

FENCE (Chain Link)
Wickwire Spencer Steel Corp.,
41 E. 42nd St., New York, N. Y.

FENCES—See WIRE FENCES

FERRO-ALLOYS
Browne, deCourcy, Inc.,
120 Broadway, New York, N. Y.
Cleveland-Cliffs Iron Co.,
Rockefeller Bldg., Cleveland, O.
Electro Metallurgical Sales Corp.,
30 E. 42nd St., New York, N. Y.
Keokuk Electro-Metals Co., Keokuk, Iowa.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co.,
30 Church St., New York, N. Y.
Metal & Thermit Corp.,
120 Broadway, New York, N. Y.
Park & Williams, Inc., Philadelphia, Pa.

FERRO-CARBON TITANIUM
Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

FERRO-CHROME
Electro Metallurgical Sales Corp.,
30 E. 42nd St., New York, N. Y.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co.,
Harrison Bldg., Philadelphia, Pa.

FERROMANGANESE
Agnew, Batteiger & Co.,
1642 Widener Bldg., Philadelphia, Pa.
Crocker Bros.,
21 E. 40th St., New York City.
Electro Metallurgical Sales Corp.,
30 E. 42nd St., New York, N. Y.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co.,
30 Church St., New York, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co.,
Harrison Bldg., Philadelphia, Pa.

FERROSILICON
Crocker Bros.,
21 E. 40th St., New York City.
Electro Metallurgical Sales Corp.,
30 E. 42nd St., New York, N. Y.
Globe Iron Co., Jackson, O.,
Keokuk Electro-Metals Co., Keokuk, Iowa.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co.,
Harrison Bldg., Philadelphia, Pa.

FERROVANADIUM
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Vanadium Corp. of America,
120 Broadway, New York.

FIRE BRICK AND CLAY
Ashland Fire Brick Co., Ashland, Ky.
Brighton Fire Brick Co.,
Block House Run, New Brighton, Pa.
Clearfield Brick Mfg. Co.,
Clearfield Trust Bldg., Clearfield, Pa.
Crescent Refractories Co.,
Curwensville, Clearfield Co., Pa.
Dover Fire Brick Co.,
Cuyahoga Bldg., Cleveland, Ohio.
General Refractories Co.,
117 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Haws Refractories Co., Johnstown, Pa.
Inland Fire Brick Co., The,
1252 E. 55th St., Cleveland, O.
Inter-State Fire Clay Co.,
1312 Citizens Bldg., Cleveland, Ohio.
Ironton Fire Brick Co., The, Ironton, Ohio.
Kier Fire Brick Co., Pittsburgh, Pa.
Laclede-Christy Clay Products Co.,
St. Louis, Mo.
Mutton Hollow Fire Brick Co., The,
Woodbridge, N. J.
Portsmouth Refractories Co., Portsmouth, O.
Pyro Clay Products Co., The, Oak Hill, O.
Queen's Run Refractories Co., Inc.,
Lock Haven, Pa.
Star Clay Products Co.,
Oliver Bldg., Pittsburgh, Pa.
Stowe-Fuller Refractories Co., The,
Rockefeller Bldg., Cleveland, O.
Superior Basic Brick Co.,
517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., Mt. Savage, Md.

FIRE CLAY (Notch)
Acme Fire Clay & Coal Co.,
Wabash Bldg., Pittsburgh, Pa.

FIRE CLAYS (Special Clays and Prepared Mixes)
Laclede-Christy Clay Products Co.,
St. Louis, Mo.

FIRE DOORS AND SHUTTERS
Kinnear Mfg. Co., The,
818-868 Field Ave., Columbus, Ohio.

FLANGES (Pipe)
Dart, E. M., Mfg. Co., Providence, R. I.

FLANGING MACHINES
Quickwork Co., The, St. Mary's, Ohio.

FLASKS (Foundry)
American Foundry Equipment Co.,
Madison Ave. and 46th St., New York City.

FLOORING (Fireproof, Metallic, Nonslipping, Ventilating)
Irving Iron Works Co.,
Long Island City, N. Y.

FLOORING (Redwood)
Pacific Lumber Co., The,
332 S. Michigan Ave., Chicago, Ill.

FLOORING (Wood Block Creosoted)
Republic Creosoting Co.,
Merchants Bank Bldg., Indianapolis, Ind.

FLOOR PLATES (Rolled Steel)
American Pressed Steel Co.,
Commercial Trust Bldg., Philadelphia, Pa.

FLUOR SPAR
Hickman, Williams & Co., Inc.,
First Nat'l Bank Bldg., Cincinnati, O.
Hillside Fluor Spar Mines,
First National Bank Bldg., Chicago, Ill.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

FLUX (Welding)
Oxweld Acetylene Co., Newark, N. J.

FORGES
Bradley, C. C., & Sons, Inc.,
432 N. Franklin St., Syracuse, N. Y.
Buffalo Forge Co.,
490 Broadway, Buffalo, N. Y.

FORGING BILLETS
Andrews Steel Co., Newport, Ky.
Central Steel Co., Massillon, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co.,
Philadelphia, Pa.

FORGING BILLETS (Alloy and Carbon Steel)
Central Steel Co., Massillon, Ohio.
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.

FORGING MACHINERY
Bliss, E. W., Co.,
53rd St. and 2nd Ave., Brooklyn, N. Y.
Bradley, C. C., & Son, Inc.,
432 N. Franklin St., Syracuse, N. Y.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Pawtucket Mfg. Co.,
327 Pine St., Pawtucket, R. I.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

HIGH GRADE
STEEL CASTINGS
Open Hearth Process
THE COMMERCIAL STEEL CASTING CO.
MARION, OHIO
Shipping Facilities on Five Railroads

Sharon Foundry Co.
STEEL CASTINGS
ACID OPEN HEARTH
We solicit your business and guarantee satisfaction
Sharon, Pa.

ACID OPEN HEARTH
STEEL CASTINGS
EXCLUSIVELY
ATLAS
Steel Casting Company
General Offices and Works
BUFFALO, N. Y.
New York Office: 200 Fifth Ave.

Strong Steel Foundry Company
ACID OPEN HEARTH
STEEL CASTINGS
33 Norris St.

BUFFALO, N.Y.

DUQUESNE STEEL FOUNDRY CO.
PITTSBURGH, PA.
STEEL ROLLS
AND
STEEL CASTINGS

"GUARANTEED"
STEEL CASTINGS
A new *Buy*-word for Steel Casting users
BLACKWOOD ELECTRIC STEEL CORP.
Sales Offices: PARKERSBURG, W. VA.
New York Chicago Pittsburgh Philadelphia
Cleveland Cincinnati Boston Minneapolis St. Louis

READING
STEEL CASTINGS
READING STEEL CASTING CO., INC. READING, PA.
The Largest Manufacturer of
MISCELLANEOUS STEEL CASTINGS
Converter Castings . . . . . 10 to 1,000 Lbs.
Acid Open Hearth Castings . . . 25 to 36,000 Lbs.

OHIO STEEL CASTINGS
Particular attention to small castings
Careful molding; electric annealing; fast machining qualities; delivery requirements met.
THE OHIO STEEL FOUNDRY CO.
Springfield, Ohio
Larger Castings made in our Foundries at Lima and Bucyrus, O.

WE MAKE ANY KIND OF OPEN HEARTH
STEEL CASTINGS
BUT ONLY ONE QUALITY—THE BEST
FEDERAL STEEL FOUNDRY CO.
Foot of Reaney St. CHESTER, PA.

FORGINGS (Drop)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Forge & Axle Co.,
2003-35 Deuber Ave., Canton, Ohio.
Champion Mch. & Forging Co.,
Cleveland, O.
Cleveland City Forge & Iron Co.,
Cleveland, Ohio.
Columbus Forge & Iron Co., Columbus, O.
Drop Forging Co. of New York,
Jersey City, N. J.
Eccles, Richard, Co., Auburn, N. Y.
General Drop Forge Co.,
1756 Elmwood Ave., Buffalo, N. Y.
Heppenstall Forge & Knife Co.,
Arsenal Station, Pittsburgh, Pa.
Kilborn & Bishop Co.,
196 Chaple St., New Haven, Conn.
Ladish Drop Forge Co., Cudahy, Wis.
Oliver Iron & Steel Corp.,
So. 10th & Muriel Sts., Pittsburgh, Pa.
Philadelphia Steel & Iron Co.,
Commercial Trust Bldg., Philadelphia, Pa.
Pittsburgh Knife & Forge Co.,
Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.
Scranton Forging Co., Scranton, Pa.
Strieby & Foote Co.,
301 Ogden St., Newark, N. J.
Transue & Williams Steel Forging Corp.,
Alliance, O.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

FORGING (Iron and Steel)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bradley, C. C., & Son, Inc.,
432 N. Franklin St., Syracuse, N. Y.
Canton Forge & Axle Co.,
2003-35 Deuber Ave., Canton, Ohio.
Champion Mch. & Forging Co., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Eccles, Richard, Co., Auburn, N. Y.
Federal Signal Co., Albany, N. Y.
General Drop Forge Co.,
1756 Elmwood Ave., Buffalo, N. Y.
Heppenstall Forge & Knife Co.,
Pittsburgh, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Leard, Wm., Co., The, New Brighton, Pa.
McMyler-Interstate Co., Bedford, O.
Midvale Co., The,
4320 Wissahickon Ave., Philadelphia, Pa.
Philadelphia Steel & Iron Co.,
Commercial Trust Bldg., Philadelphia, Pa.
Pollak Steel Co., The, Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.
Titusville Forge Co., Titusville, Pa.
Transue-Williams Steel Forging Corp.,
Alliance, Ohio.
Vanadium Corp. of America,
120 Broadway, New York, N. Y.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.

FORMS (Steel for Concrete Construction)
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

FOUNDRY EQUIPMENT & SUPPLIES
American Foundry Equipment Co.,
Madison Ave. and 46th St., New York City.
National Engineering Co.,
549 W. Washington Blvd., Chicago, Ill.
Whiting Corporation, Harvey, Ill.

FOUNDRY PATTERN PLATES (Steel)
Moltrup Steel Products Co.,
Beaver Falls, Pa.

FRAMES (Wire Drawing)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., The,
Cuyahoga Falls, O.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FUEL OIL BURNING SYSTEMS AND PLANTS
Fuller Engineering Co., Fullerton, Pa.
Hagan, George J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.

FURNACE APPLIANCES (Water Cooled)
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

FURNACE INSULATION
Armstrong Cork & Insulation Co.,
24th Street, Pittsburgh, Pa.
Celite Products Co.,
837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co.,
26 Cortlandt St., New York, N. Y.

FURNACE SYSTEMS (Open Hearth)
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

FURNACES (Annealing, Case Hardening and Heat Treating)
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
Hagan, George J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.
Tate, Jones & Co., Inc.,
914 Empire Bldg., Pittsburgh, Pa.

FURNACES (Blast)
Pennsylvania Engrg. Wks., New Castle, Pa.

FURNACES (Electric)
American Bridge Co.,
71 Broadway, New York, N. Y.
General Electric Co., Schenectady, N. Y.
Hagan, George J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.
Pittsburgh Electric Furnace Co.,
Union Bank Bldg., Pittsburgh, Pa.
Swindell, Wm., & Bros.,
5035 Jenkins Arcade Bldg., Pittsburgh, Pa.

FURNACES (Open Hearth)
Laughlin, Alex., & Co.,
First National Bank Bldg., Pittsburgh, Pa.
Open Hearth Steel Furnace Co.,
300 Westinghouse Bldg., Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.
Vulcan Furnace & Equipment Co.,
300 Westinghouse Bldg., Pittsburgh, Pa.

GAGES, RECORDING (Pressure and Vacuum)
Bristol Co., The, Waterbury, Conn.

GALVANIZING
Federal Signal Co., Albany, N. Y.

GALVANIZING EQUIPMENT
Monessen Foundry & Machine Co.,
Monessen, Pa.

GALVANIZING KETTLES AND POTS
National Wrought Iron Annealing Box Co.,
Washington, Pa.
Wilfong, Millard F., Iron Works Co.,
Philadelphia, Pa.

GALVANIZING PLANTS
Wilfong, Millard F., Iron Works Co.,
Philadelphia, Pa.

GALVANIZING PLANTS (For Sheets)
Erie Foundry Co., Erie, Pa.
United Engineering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

GANG SLITTERS
Ams, Max, Machine Co., The,
101 Park Ave., New York, N. Y.

GAS BOOSTERS (Rotary Positive Pressure)
Connersville Blower Co., The,
Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

GAS EXHAUSTERS
Connersville Blower Co., Connersville, Ind.

GAS PRODUCER PLANTS
Hagan, Geo. J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.
Koppers Co., The, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
U. S. Cast Iron Pipe & Foundry Co.,
Burlington, N. J.
Wellman-Seaver-Morgan Co.,
7000 Central Ave., Cleveland, O.
Wood, R. D., & Co.,
400 Chestnut St., Philadelphia, Pa.

GAS PRODUCERS
Chapman Engineering Co., Mt. Vernon, O.
Cooper, C. & G., Co., Mt. Vernon, Ohio.
Duff Patents Co., Inc.,
321 Union Trust Bldg., Pittsburgh, Pa.

GAS RECOVERY COKE OVEN AND GAS PLANTS
Koppers Co., The, Pittsburgh, Pa.

GAS (Oxygen and Nitrogen)
Linde Air Products Co.,
30 E. 42nd St., New York, N. Y.

GAS (Welding and Cutting)
Prest-O-Lite Co., Inc., The, Newark, N. J.

GAUGES (Welding)
Oxweld Acetylene Co., Newark, N. J.

GEAR BLANKS
Bethlehem Steel Co., Bethlehem, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Transue & Williams Steel Forging Corp.,
Alliance, Ohio.

GEARS
Jones, W. A., Foundry & Machine Co.,
4437 W. Roosevelt St., Chicago, Ill.
Stroh Steel Hardening Process Co.,
Westinghouse Bldg., Pittsburgh, Pa.

GEARS AND GEAR CUTTING (Iron & Steel)
American Adamite Co., The,
311 Oliver Bldg., Pittsburgh, Pa.
Connecticut Gears, Inc., Waterbury, Conn.
Fawcus Machine Co.,
2818 Smallman St., Pittsburgh, Pa.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co.,
111 Broadway, New York, N. Y.
Nuttall, R. D., Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Simonds Mfg. Co.,
25th St. & Liberty Ave., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Wappat Gear Works,
Homewood Station, Pittsburgh, Pa.

GEARS (Automobile, Truck, Tractor)
General Electric Co., Schenectady, N. Y.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Herringbone)
Falk Corporation, The, Milwaukee, Wis.
Fawcus Machine Co.,
2818 Smallman St., Pittsburgh, Pa.
Niles-Bement-Pond Co.,
111 Broadway, New York City.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Machine Molded)
Taylor-Wilson Manufacturing Co.,
McKees Rocks, Pa.

GEARS (Rawhide)
Chicago Rawhide Mfg. Co.,
1305 Elston Ave., Chicago, Ill.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Reverse Marine)
General Electric Co., Schenectady, N. Y.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.

GENERATING SETS
General Electric Co., Schenectady, N. Y.

GENERATORS (Direct and Alternate Current)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

GENERATORS (Oxygen and Hydrogen)
Electrolabs Co., The,
2635 Penn Ave., Pittsburgh, Pa.

GLASS CLEANERS (Liquid and Powder)
Skybryte Co., The,
Keith Bldg., Cleveland, Ohio.

GLOVES (Asbestos)
Oxweld Acetylene Co., Newark, N. J.

GRATING (Flooring, Subway, Step and Other Purposes)
Irving Iron Works Co.,
Long Island City, N. Y.

GREASE (Lubricating)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.
Ohio Grease Co., Loudonville, Ohio.

GRINDERS (Crankshaft)
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Electric Pneumatic-Portable)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City.
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway,
New York City.

GRINDERS (Roll)
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES
Landis Tool Co., Waynesboro, Pa.

GRINDING PANS
Clearfield Machine Shops, Clearfield, Pa.
Hadfield-Penfield Steel Co., Bucyrus, Ohio.
National Engineering Co.,
549 W. Washington Blvd., Chicago, Ill.
Phillips & McLaren Co., Pittsburgh, Pa.

GROUP INSURANCE
Travelers Insurance Co., The,
Hartford, Conn.

HAMMERS (Chipping, Riveting and Calking)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City.
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway,
New York City.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

SERVICE
SMALL—STEEL—CASTINGS
THE WEST STEEL CASTING CO.
CLEVELAND OHIO
"HE PROFITS MOST WHO SERVES BEST"
QUALITY

Acid Open Hearth
FORGING INGOTS
BILLETS
HOT ROLLED BARS
Carbon and Alloy Steel
STEEL CASTINGS (for Railroads)
The McConway & Torley Co.
ARSENAL STA. PITTSBURGH

UNION STEEL CASTING CO.
Pittsburgh, Pa.
ANNEALING BOXES AND BOTTOMS
General Rolling Mill Machinery Castings

HIGH GRADE SMALL
ELECTRIC STEEL CASTINGS
Also
Chrome, Nickel and Vanadium Alloy Steel Castings
The Crucible Steel Casting Co.
CLEVELAND, O.

MILWAUKEE STEEL FOUNDRY CO.
101-131 South Water St.
MILWAUKEE, WIS.
STEEL CASTINGS
BASIC ELECTRIC FURNACE EQUIPMENT

Certified Malleable Iron Castings
Belle City Malleable Iron Company
RACINE, WISCONSIN

Refined Electric Steel Castings
Racine Steel Castings Company
RACINE, WISCONSIN

ELECTRIC
STEEL CASTINGS
Farrell-Cheek Steel Foundry Co.
Sandusky, Ohio

MAYNARD ELECTRIC STEEL CASTING COMPANY
2-12 Kilbourn Rd. MILWAUKEE, WIS.
ELECTRIC STEEL CASTINGS
from 1 to 5000 lbs. each

REFINED ELECTRIC
STEEL CASTINGS
VALUE PROMPT DELIVERY
PELTON STEEL CO.
Milwaukee, Wisconsin
Chicago Office, 628 McCormick Bldg.

EASTERN
ELECTRIC OPEN HEARTH
STEEL CASTINGS
NEWARK N J

ELECTRIC STEEL CASTINGS
CHICAGO STEEL FOUNDRY CO.

SERVICE QUALITY
Geo. H. Smith Steel Casting Co.
ELECTRIC STEEL CASTINGS
Milwaukee, Wis.
Chicago Office: 111 W. Washington St.

HAMMERS (Drop)
Bliss, E. W., Co.,
53rd St. and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engrg. Co.,
Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Long & Allstatter Co., Hamilton, Ohio.
Niles-Bement-Pond Co.,
111 Broadway, New York City.
Toledo Machine & Tool Co., Toledo, O.

HAMMERS (Forging)
Central Machine Works Co.,
Central and 13th St. N. E.,
Minneapolis, Minn.

HAMMERS (Power)
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Central Machine Works Co.,
Central and 13th St. N. E.,
Minneapolis, Minn.
Cleveland Punch & Shear Works Co.,
Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Niles-Bement-Pond Co.,
111 Broadway, New York City.
Yoder Co., The,
5510 Walworth St., Cleveland, O.

HAMMERS (Rawhide)
Chicago Rawhide Mfg. Co.,
1305 Elston Ave., Chicago, Ill.

HAMMERS (Steam)
Chambersburg Engineering Co.,
Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.

HANGERS (Shaft)
Hyatt Roller Bearing Co., Newark, N. J.

HEATERS (Feed Water)
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.

HOISTING MACHINERY
Brown Hoisting Machinery Co.,
4403 St. Clair Ave., Cleveland, Ohio.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Illinois Malleable Iron Co.,
180 Diversey Blvd., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co.,
608 S. Dearborn St., Chicago, Ill.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.
Treadwell Engineering Co., Easton, Pa.

HOISTS (Chain)
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Electric)
Euclid Crane & Hoist Co., Dept. B.,
Euclid, Ohio.
Link-Belt Co., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co.,
Milwaukee, Wis.
Northern Engineering Works,
214 Chene St., Detroit, Mich.
Pawling & Harnischfeger Co.,
Milwaukee, Wis.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.
Stamp Electric Hoist Co.,
968 E. 69th Place, Cleveland, O.

HOISTS (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway,
New York City.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

HOLDERS (Tool)—See TOOL HOLDERS

HOOPS AND BANDS
Acme Steel Goods Co.,
2840 Archer Ave., Chicago, Ill.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Morris, Wheeler & Co.,
30th and Locust Sts., Philadelphia, Pa.
Ryerson, Joseph T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.
West Leechburg Steel Co., Pittsburgh, Pa.

HOOPS, BANDS AND SHAPES (Galvanized)
McCalla, Harold, Co., The,
Beach St. and E. Columbia Ave.,
Philadelphia, Pa.

HOSE (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway,
New York City.

HOSE (Welding)
Oxweld Acetylene Co., Newark, N. J.

HOT BEDS
McKee, Willis, 2422 Euclid Ave.,
Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

HOT BLAST STOVES
Riter-Conley Co.,
Oliver Bldg., Pittsburgh, Pa.

HYDRAULIC MACHINERY
Allis Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
United Engineering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

HYDRAULIC MACHINERY (Punches and Shears)
Chambersburg Engineering Co.,
Chambersburg, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

HYDROGEN GENERATING APPARATUS
Electrolabs Co., The,
2635 Penn Ave., Pittsburgh, Pa.

INDUSTRIAL HAULAGE EQUIPMENT
General Electric Co., Schenectady, N. Y.

INGOT MOLDS
American Adamite Co., The,
311 Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdy. & Mach. Co.,
Birdsboro, Pa.
Penn Mold & Mfg. Co., Wheeling, W. Va.
Valley Mould & Iron Corp.,
Sharpsville, Pa.

INGOTS (Steel)
McConway & Torley Co.,
Arsenal Station, Pittsburgh, Pa.

INSTRUMENTS (Electric Indicating and Recording)
General Electric Co., Schenectady, N. Y.

INSULATING BRICK
Armstrong Cork & Insulation Co.,
24th Street, Pittsburgh, Pa.
Celite Products Co.,
837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co.,
26 Cortlandt St., New York,, N. Y.

INSULATION (Furnaces, Boiler Settings, Ovens, Steam Pipe, Etc.)
Armstrong Cork & Insulation Co.,
24th Street, Pittsburgh, Pa.
Celite Products Co.,
837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co.,
26 Cortlandt St., New York, N. Y.

INSURANCE
Travelers Insurance Co., The, Hartford, Conn.

IRON
Interstate Iron & Steel Co.,
104 So. Michigan Ave., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Newport Rolling Mill Co., Newport, Ky.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Bar)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg.,
Cleveland, O.
Lockhart Iron & Steel Co., Pittsburgh, Pa.

IRON (Chain)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co. Creighton, Pa.

IRON (Engine Bolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Silver)
Globe Iron Co., Jackson, O.
Keokuk Electro-Metals Co., Keokuk, Iowa.

IRON (Staybolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON ORE
Agnew, Batteiger & Co.,
1642 Widener Bldg., Philadelphia, Pa.
Cleveland-Cliffs Iron Co., Cleveland, O.
Hanna, The M. A., Co., Cleveland, O.
Hillman Coal & Coke Co.,
First Nat'l Bank Bldg., Pittsburgh, Pa.
Marquette Ore Co.,
Rockefeller Bldg., Cleveland, O.
Park & Williams, Inc.,
Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co.,
Western Reserve Bldg., Cleveland, O.
Quinn, Clement K., & Co., Duluth, Minn.
Savage & Co., John A., Duluth, Minn.
Snyder, W. P., & Co., Oliver Bldg.,
Pittsburgh, Pa.
Tod-Stambaugh Co.,
Hanna Bldg., Cleveland, O.
Witherbee, Sherman & Co.,
2 Rector St., New York, N. Y.

IRON AND STEEL (Swedish)
Ljusne-Woxna, Aktiebolag, Ljusne, Sweden.

JOISTS AND STUDS (Pressed Steel)
Central Steel Co., Massillon, Ohio.
Truscon Steel Co.,
615 Wayne St., Detroit, Mich.

KETTLES (Galvanizing)—See GALVANIZING KETTLES AND POTS

KEYS AND COTTERS (Machine)
Leard, Wm., Co., The, New Brighton, Pa.
Moltrup Steel Products Co.,
Beaver Falls, Pa.
Morton Mfg. Co. Muskegon Heights, Mich.
Standard Gauge Steel Co., Beaver Falls, Pa.

KEYSEATING MACHINES
Morton Mfg. Co., Muskegon Heights, Mich.
Pawtucket Mfg. Co.,
327 Pine St., Pawtucket, R. I.

KNIVES AND SHEAR BLADES — See SHEAR BLADES AND KNIVES

LADLES
Pennsylvania Engrg. Works, New Castle, Pa.
Riter-Conley Co., Oliver Bldg.,
Pittsburgh, Pa.

LADLES (Sleeves and Nozzles)
Laclede-Christy Clay Products Co.,
St. Louis, Mo.

LATH (Expanded Metal)
Central Steel Co., Massillon, Ohio.
Truscon Steel Co.,
615 Wayne St., Detroit, Mich.

LATHE DOGS (Safety)
Williams, J. H., & Co
58 Richards St., Brooklyn, N. Y.

LATHES
Niles-Bement-Pond Co.,
111 Broadway, New York, N. Y.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.

LATHES (Roll Turning)
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
United Enginering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Youngstown Foundry & Machine Co.,
Youngstown, Ohio.

LEAD BURNING APPARATUS (Oxy-Acetylene)
Oxweld Acetylene Co., Newark, N. J.

LEAD POTS
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.

LEATHER BELTING — See BELTING (Leather)

LETTERHEADS (Engraved)
Wiggins, John B., Co.,
705 Peoples Gas Bldg., Chicago, Ill.

LEVELING MACHINES
United Engineering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

LIABILITY INSURANCE
Travelers Insurance Co., The, Hartford, Conn.

LIFTING MAGNETS
Cutler-Hammer Mfg. Co., The,
Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Ohio Electric & Controller Co.,
5900 Maurice Ave., Cleveland, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES
Porter, H. K., Co.,
Union Bank Bldg., Pittsburgh, Pa.

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., 1100 Ivanhoe Rd.,
Cleveland, O.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., 1100 Ivanhoe Rd.,
Cleveland, O.

LUBRICANTS (Grease)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.
Ohio Grease Co., Loudonville, Ohio.

LUBRICATORS (Machinery)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill

LUBRICATORS (Steam Cylinder)
Ohio Grease Co., Loudonville, Ohio.

MACHINE KEYS—See KEYS AND COTTER (Machine)

MACHINE WORK
Air Tight Steel Tank Co.,
Mansion & Gloster Sts., Pittsburgh, Pa.
Beacon Pressed Steel Co., Inc.,
86 Page St., Providence, R. I.
Bettcher Stamping & Mfg. Co.,
3106 W. 61st St., Cleveland, O.
Bliss, E. W., Co.,
53rd St. and 2nd Ave., Brooklyn, N. Y.
Federal Signal Co., Albany, N. Y.
Gray, Peter, & Sons Co., Cambridge, Mass.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.
Lammert & Mann Co.,
Wood and Walnut Sts., Chicago, Ill.
Lion Manufacturing Co.,
Fifth and Heaton Sts., Hamilton, O.
Rivett Lathe & Grinder Corp.,
Boston, 35, Mass.
Smith Gas Engineering Co., Dayton, O.

LUBRICATION MACHINERY
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.

SECOND HAND MACHINERY
See Page 117.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

Announcement

THE **ARCADE** foundries for years have produced Malleable Chain of highest quality which has been marketed by other manufacturers.

Now, Arcade Chain is produced, assembled, tested, stored and marketed by one organization, Arcade Malleable Iron Co., with plants at Worcester and Springfield, Mass.

Let our Engineers help solve your transmission problems.

Arcade Detachable Cast Chain

is made in a plant where "SERVICE" is and always has been the watchword—the kind of service that has built up our present two large eastern plants—the kind of service that means the making and promptly supplying of stronger and more reliable chain than has ever before been experienced in the Malleable Chain industry.

Automatic Chain Assembling Machines of our own design speed up our production. Miles of Arcade Malleable Chain are constantly kept in stock to give you service. All unusual styles and sizes of chain are carried in stock ready for immediate shipment. Special designs of any nature whatever will be made up promptly to order. Our extensive equipment makes it possible to turn out special work in the shortest time.

Our Transmission and Material Handling Engineers stand ready to help *you* solve *your* problems. If you are not certain that you are moving your materials in the most economical manner, better ask our Engineers for a suggestion.

Inquiries solicited.

ARCADE MALLEABLE IRON CO.
WORCESTER, MASS.
ESTABLISHED 1850

MAGNESITE
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.

MAGNETS (Lifting)—See LIFTING MAGNETS

MANGANESE METALS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

MATERIAL HANDLING MACHINERY
Browning Co., The, E. 162nd St. & Waterloo Rd., Cleveland, O.
McMyler-Interstate Co., Bedford, O.

MELTING BAR (Low Phosphorus)
Penn Iron & Steel Co., Creighton, Pa.

MERCHANT MILL EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

METAL CLEANER
Ford, J. B., Co., The, Wyandotte, Mich.

METAL SPECIALTIES AND PARTS
Budd, E. G., Mfg. Co., Specialty Dept., Philadelphia, Pa.
Erdle Perforating Co., 171 York St., Rochester, N. Y.

METAL (Perforated)
Erdle Perforating Co., 171 York St., Rochester, N. Y.

METALS (Nonferrous)
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

METAL STAMPINGS—See STAMPINGS

METAL WORKING MACHINES — See SHEET METAL WORKING MACHINERY

METERS (Gas and Air)
Connersville Blower Co., The, Connersville, Ind.
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

MILLING MACHINES
Niles-Bement-Pond Co., 111 Broadway, New York, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

MILLS (Blooming, Universal Plate, Sheet, Etc.)
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
National Roll & Foundry Co. Avonmore, Pa.
Treadwell Engineering Co., Easton, Pa.

MINING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

MIXERS (Sand)
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

MIXING, KNEADING, TEMPERING AND PUGGING MACHINERY
Hadfield-Penfield Steel Co., The, Bucyrus, Ohio.
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

MOLDS (Ingot)—See INGOT MOLDS

MOLDING MACHINES
American Foundry Equipment Co., 366 Madison Ave., New York, N. Y.
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.
Herman Pneumatic Machine Co., 806 Union Bank Bldg., Pittsburgh, Pa.

MOLDING MACHINES (Tractor Type Sand Throwing)
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.

MONEL METAL
International Nickel Co., 67 Wall St., New York, N. Y.

MOTORS (Electric)
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

NAILS
American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

NAILS (Coated and Galvanized)
American Steel Co., Park Bldg., Pittsburgh, Pa.

NICKEL
American Nickel Corp., Clearfield, Pa.
International Nickel Co., 67 Wall St., New York. N. Y.
United States Nickel Co., New Brunswick, N. J.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

NITROGEN (Gas)
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York N. Y.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., The, Hanna Bldg., Cleveland, O.
Clark Bros. Bolt Co., Milldale, Conn.
Lake Erie Bolt & Nut Co. 915 E. 63rd St., Cleveland, Ohio.
Maryland Bolt & Nut Co., The, Mt. Washington, Baltimore, Md.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

OIL (Fuel)—See FUEL OIL

OIL (Lubricating)
Ohio Grease Co., Loudonville, Ohio.

OPEN-HEARTH FURNACES — See FURNACES (Open Hearth)

OVENS (Coke By-Product Recovery)
Koppers Co., The, Pittsburgh, Pa.

OXY-ACETYENE WELDING AND CUTTING—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

OXYGEN AND HYDROGEN
International Oxygen Co., Newark, N. J.

OXYGEN AND HYDROGEN GENERATING EQUIPMENT
Electrolabs Co., The, 2635 Penn Ave., Pittsburgh, Pa.

OXYGEN IN CYLINDERS
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.

OXYGEN (Gas)
Linde Air Products Co., 30 E. 42nd St., New York, N. Y.

PACKING (Leather)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

PATTERN PLATES (Steel)
Moltrup Steel Products Co., Beaver Falls, Pa.

PATTERNS (Wood & Metal)
Seneca Pattern Works, Seneca Falls, N. Y.

PERFORATED METAL
Erdle Perforating Co., 171 York St., Rochester, N. Y.

PICKLING TANKS
Hauser-Stander Tank Co., The, Cincinnati, O.

PICKS, MATTOCKS, ETC.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

PIG IRON
Addy, The Matthew, Co., Cincinnati, O.
Adrian Furnace Co., Du Bois, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Cleveland-Cliffs Iron Co., Cleveland, O.
Crocker Bros., 21 E. 40th St., New York City.
Delaware River Steel Co., Chester, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Eaton, Rhodes & Co., Cincinnati, Ohio.
Globe Iron Co., Jackson, O.
Hanna, The M. A., Co., Cleveland, O.
Hickman, Williams & Co., First Nat'l Bank Bldg., Cincinnati, O.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Ljusne-Woxna Aktiebolag, Ljusne, Sweden.
Mohr, J. J., & Son, Bullitt Bldg., Philadelphia.
Park & Williams, Inc., Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co., Western Reserve Bldg., Cleveland, O.
Pilling & Co., Real Estate Trust Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, Ohio.
Runyon, W. C., & Co.,
Savage & Co., John A., Duluth, Minn.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.
Stewart Furnace Co., 1335 Rockefeller Bldg., Cleveland, O.
Valley Mould & Iron Corp., Sharpsville, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire-Spencer Steel Corp., 41 E. 42nd St., New York, N. Y.
Witherbee, Sherman & Co., 2 Rector St., New York City.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

PIG IRON (Charcoal)
Rogers, Brown & Co., Cincinnati, Ohio.

PILE DRIVERS
Browning Co., The, E. 162nd St. & Waterloo Rd., Cleveland.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

PILING (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Zelnicker, WalterA., Supply Co., 511 Locust St., St. Louis, Mo.

PINIONS—See GEARS AND GEAR CUTTING

PINS
Champion Rivet Co., The, E. 108th St. and Harvard Ave., Cleveland, Ohio.

PIPE (Riveted Steel)
Abendroth & Root Mfg. Co., Woolworth Bldg., New York, N. Y.
Petroleum Iron Works Co. of Ohio, Sharon, Pa.

PIPE (Spiral Riveted)
Abendroth & Root Mfg. Co., New York, N. Y.

PIPE (Standard)
Wheeling Steel Corp., Wheeling, W. Va.

PIPE (Steel)
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Central Tube Co., First National Bank Bldg., Pittsburgh, Pa.
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh.
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

PIPE (Welded)
Pittsburgh Piping & Equipment Co., 35th and Charlotte Sts., Pittsburgh, Pa.

PIPE (Wrought Iron)
Youngstown Sheet & Tube Co., The, Youngstown, Ohio.

PIPE (Wrought Steel)
Central Tube Co., First National Bank Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PIPE BENDS
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.

PIPE CUTTING AND THREADING MACHINERY
Standard Engrg. Co., Ellwood City, Pa.

PIPE FITTINGS
Illinois Malleable Iron Co., 1801 Diversey Blvd., Chicago, Ill.
Jenkins Bros., 80 White St., New York City.
Pittsburgh Piping Equip. Co., 35th & Charlotte Sts., Pittsburgh, Pa.

PIPE MILL MACHINERY
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE STRAIGHTENING MACHINES
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE WRENCHES — See WRENCHES (Pipe)

PIPING CONTRACTORS
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.

PLANERS AND SHAPERS
Cleveland Punch & Shear Works, Cleveland, Ohio.
Morton Mfg. Co., Muskegon Heights, Mich.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

PLATE CASTORS
Hyatt Roller Bearing Co., Newark, N. J.

PLATES (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

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CASTINGS

PITTSBURGH MALLEABLE IRON CO.
MALLEABLE CASTINGS
Pittsburgh, Penna.

ZANESVILLE MALLEABLE CO.
MALLEABLE CASTINGS
ZANESVILLE, OHIO

MALLEABLE CASTINGS
We Positively guarantee Quality and Deliveries
THE COLUMBUS MALLEABLE IRON CO.
760 CURTIS AVE., COLUMBUS, OHIO

MALLEABLE IRON CASTINGS
ACME STEEL & MALLEABLE IRON WORKS, INC.
BUFFALO, N. Y.
GRAY IRON CASTINGS
Quality and Deliveries Guaranteed

MALLEABLE CASTINGS
of High Strength
Plants at Worcester and Springfield, Mass.
Arcade Detachable Chain
Arcade Malleable Iron Co.
Established 1850
Albany and Muskeego Sts. Worcester, Mass.

MALLEABLE IRON CASTINGS
NEWARK MALLEABLE IRON WORKS
QUALITY NEWARK, N.J. SERVICE

Temple Malleable Iron & Steel Co.
Office 312 Harrison Bldg. PHILADELPHIA
High Grade Clean CASTINGS
Foundry TEMPLE, PA.
Certified Malleable Iron Castings

MALLEABLE IRON CASTINGS
Quality and Quantity Producers
VERMILION MALLEABLE IRON CO.
641 RAILWAY EXCHANGE BLDG. CHICAGO
200 NO. SIXTH AVE. HOOPESTON, ILLINOIS

Malleable Castings
of GUARANTEED QUALITY for Railroad, Agricultural Implement and Automobile Requirements
NORTHERN MALLEABLE IRON CO.
ST. PAUL, MINN.

Kalamazoo Malleable Iron Co.
GUARANTEED QUALITY MADE FOR YOU IN
KALAMAZOO

Dayton Malleable Iron Co.
Dayton, Ohio

ST. LOUIS
MALLEABLE CASTING COMPANY
7701 NO. CONDUIT AVE., ST. LOUIS, MO.
MALLEABLE GRAY IRON

PLATES (Rolled Steel—Floor)
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

PLATES (Sheared and Universal)
Allegheny Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., The, Hanna Bldg., Cleveland, O.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Illinois Steel Warehouse Co., 208 So. La Salle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Morris & Bailey Steel Division, Oliver Iron & Steel Corp., Wilson Station, Pittsburgh, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky.
Otis Steel Co., Cleveland. O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Wheeling Steel Corp., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES — (Terne and Tin) — See TIN PLATE

PLUMBING EQUIPMENT
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

PNEUMATIC TOOLS—See TOOLS (Pneumatic)

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

POTS (Galvanizing and Tinning)—See GALVANIZING KETTLES AND POTS

POWDERED COAL EQUIPMENT
Fuller Engineering Co., Fullerton, Pa.

PRESSED METAL—See STAMPING

PRESSED STEEL PARTS—See STAMPINGS

PRESSES
Ams, Max, Machine Co., 101 Park Ave., New York City.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Henry & Wright Mfg. Co., Windsor St., Hartford, Conn.
Logemann Bros. Co., 3120 Burleigh St., Milwaukee, Wis.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Toledo Machine & Tool Co., Toledo, O.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Die Cutting)
Logeman Bros. Co., 3120 Burleigh St., Milwaukee, Wis.

PRESSES (Forging)
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

PRESSES (Hydraulic)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Logemann Brothers Co., 3120 Burleigh Ave., Milwaukee, Wis.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Metal Drawing, Etc.)
Ams, Max, Machine Co., The, 101 Park Ave., New York, N. Y.
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Streine Tool & Mfg. Co., The, New Bremen, Ohio.

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PRESSES (Shaft and Pipe Straightening—Hydraulic)
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United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

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Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Connersville Blower Co., The, Connersville, Ind.
Platt Iron Works, Dayton. Ohio.

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Ingersoll-Rand Co., 11 Broadway, New York

PUMPS (Centrifugal)
Ingersoll-Rand Co., 11 Broadway, New York
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Morris Machine Works, Baldwinsville, N. Y.
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Henry & Wright Mfg. Co., Windsor St., Hartford, Conn.

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Thomas Spacing Co., Fulton Bldg., Pittsburgh, Pa.

PUNCHES AND DIES
Cleveland Steel Tool Corp., The, 660 East 82nd St.. Cleveland, O.
Marchant, George F., Co., 1434 S. Rockwell, Chicago, Ill.
Richards, I. P., Co., Providence, R. I.

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Long & Allstatter Co., Hamilton, O.
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Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

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Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

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Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.

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Bour, L. J., Refractories Co., Inc., The, Scranton, Pa.
Brighton Fire Brick Co., Block House Run, New Brighton, Pa.
Crescent Refractories Co., Curwensville, Pa.

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Harbinson-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Ironton Fire Brick Co., The, Ironton, O.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Mutton Hollow Fire Brick Co., Woodbridge, N. J.
Queen's Run Refractories Co., Inc., Lock Haven, Pa.
Soisson, Joseph, Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Refractories Co., The, Rockefeller Bldg., Cleveland, O.
Superior Basic Brick Co., 517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., 1113 Fidelity Bldg., Baltimore Md.

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Vaughan Machinery Co., The, Cuyahoga Falls, O.

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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Trumbull Steel Co., The, Warren, Ohio.
Weirton Steel Co., Weirton, W. Va.
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Youngstown Sheet & Tube Co., Youngstown, O.

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Wheeling Steel Corp., Wheeling, W. Va.

SOAKING PIT SEATS & COVERS
Monessen Foundry & Machine Co., Monessen, Pa.

SPACING TABLES
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

SPEED REDUCERS
Jones, W. A., Foundry & Machine Co., 4437 Roosevelt St., Chicago, Ill.

SPIEGELEISEN
Leavitt, C. W., & Co., 30 Church St., New York, N. Y.
New Jersey Zinc Co., The, Maiden Lane & Front St., New York, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

SPIKES
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.

SPRINGS
American Spiral Spring & Mfg. Co., 5500 Butler St., Pittsburgh, Pa.
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.
Cook Spring Co., Ann Arbor, Mich.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Gibson, Wm., D., Co., 1800 Clybourn Ave., Chicago, Ill.
Raymond Mfg. Co., Corry, Pa.
Vanadium Corp. of America, 120 Broadway, New York, N. Y.
Wickwire Spencer Steel Corp., 11 E. 42nd St., New York, N. Y.

SPECIAL MACHINERY
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Lammert & Mann Co., Chicago, Ill.
National Roll & Foundry Co., Avonmore, Pa.
Smith Gas Engineering Co., Dayton, Ohio.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

SPRINGS (Coil and Flat)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.
Cook Spring Co., Ann Arbor, Mich.
Gibson, Wm. D., Co., 1800 Clybourn Ave., Chicago, Ill.

SPRING COILING MACHINERY
Sleeper & Hartley, Inc., 335 Chandler St., Worcester, Mass.

SPRUE CUTTERS
Shuster, The F. B., Co., New Haven, Conn.

STACKS (Steel)
Heltzel Steel Form & Iron Co., The, Warren, Ohio.
Hendrick Manufacturing Co., Carbondale, Pa.
Petroleum Iron Works Co. of Ohio, Sharon, Pa.
Sotter Bros., Inc., Pottstown, Pa.

STAIR STEPS AND TREADS (Nonslipping)
Irving Iron Works Co., Long Island City, N. Y.

STAMPINGS
Allegheny Steel Co., Pittsburgh, Pa.
Bettcher Stamping & Mfg. Co., 3106 W. 61st., Cleveland, O.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Budd, E. G., Mfg. Co., Specialty Dept., Philadelphia, Pa.
Cleveland Metal Products Co., 1135 Ivanhoe Road, Cleveland, Ohio.
Crosby Co., 183 Pratt St., Buffalo, N. Y.
Hunt, C. Howard, Pen Co., Camden, N. J.
Lindsay Chaplet & Mfg. Co., Harrison Bldg., Philadelphia, Pa.
National Blank Book Co., Holyoke, Mass.
Niles Steel Products Co., The, Niles, Ohio.
Truscon Steel Co., 615 Wayne St., Detroit, Mich.

STAMPS (Steel)
Matthews, James H., & Co., 2016 Forbes Field, Pittsburgh, Pa.
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

STARTERS (Electric Motor)
Electric Controller & Mfg. Co., Cleveland.

STEAM SPECIALTIES
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

STEEL
Andrews Steel Co., Newport, Ky.
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh Pa.
Central Steel Co., The, Massillon, Ohio.
Hickman Williams & Co., Inc., First Nat'l Bldg., Cincinnati, O.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Illinois Steel Warehouse Co., 208 So. La Salle St., Chicago, Ill
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lockhart Iron & Steel Co., Aliquippa, Pa.
Lukens Steel Co., Coatesville, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Phillips, F. R., & Sons Co. Pennsylvania Bldg., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
West Leechburg Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Corp., 41 E. 42nd St., New York, N. Y.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Agricultural)
Bethlehem Steel Co., Bethlehem, Pa.
Pollak Steel Co., The, Cincinnati, O.

STEEL (Alloy)
Andrews Steel Co., Newport, Ky.
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Lancaster Steel Products Corp., Lancaster, Pa.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Vanadium Corp. of America, 120 Broadway, New York, N. Y.

STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lancaster Steel Products Corp., Lancaster, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Crucible)
Atlas Steel Corp., Dunkirk, N. Y.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Cold Rolled Steel Co., Verona, Pa.

STEEL DOORS AND SHUTTERS
Kinnear Manufacturing Co., 818-868 Field Ave., Columbus, O.

STEEL FABRICATORS—See BRIDGES, BUILDINGS, VIADUCTS (Steel)

STEEL (High Speed)
Atlas Steel Corp., Dunkirk, N. Y.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium Alloys Steel Co., Latrobe, Pa.

STEEL (Open Hearth)
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel Co., Massillon, Ohio.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Pardee Steel Corp., Perth Amboy, N. J.
Washburn Wire Co., Phillipsdale, R. I.

STEEL (Open-hearth—Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Lancaster Steel Products Corp., Lancaster, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Spring)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

STEEL (Stainless)
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Stamping and Drawing)
Columbia Steel Co., Elyria, Ohio.
Greer Steel Co., Dover, Ohio.
Griffin Mfg. Co., 15th and Cherry Sts., Erie, Pa.

STEEL (Strip, Hot and Cold Rolled)
Acme Steel Goods Co., 2840 Archer Ave., Chicago, Ill.
Central Steel Co., Massillon, Ohio.
Columbia Steel Co., The, Elyria, O.
Greer Steel Co., Dover, Ohio.
Griffin Mfg. Co., 15th and Cherry Sts., Erie, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Lancaster Steel Products Corp., Lancaster, Pa.
Morris & Bailey Steel Division, Oliver Iron & Steel Corp., Wilson Station, Pittsburgh, Pa.
Pittsburgh Cold Rolled Steel Co., Verona, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
Trumbull Steel Co., The, Warren, Ohio.
West Leechburg Steel Co., Pittsburgh, Pa.

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STEEL (Structural)
Alliance Structural Co., Alliance, Ohio.
American Bridge Co.,
71 Broadway, New York, N. Y.
Belmont Iron Works,
22nd & Washington Ave., Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.
Bourne-Fuller Company,
Hanna Bldg., Cleveland, Ohio.
Carnegie Steel Co.,
431 Carnegie Bldg., Pittsburgh, Pa.
Eichleay, John Jr., Co.,
So. 20th and Wharton, Pittsburgh, Pa.
Erie Steel Construction Co., The, Erie, Pa.
Illinois Steel Warehouse Co.,
208 So. La Salle St., Chicago, Ill
Kratzer, W. N., Co.,
3212 Smallman St., Pittsburgh, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
McClintic-Marshall Co.,
Oliver Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Morris, Wheeler & Co.,
30th and Locust Sts., Philadelphia, Pa.
Ohio Structural Steel Co., The,
Newton Falls, Ohio.
Pacific Coast Steel Co.,
Rialto Bldg., San Francisco, Cal.
E. R. Phillips & Sons Co.,
Pennsylvania Bldg., Philadelphia, Pa.
Phoenix Iron Co.,
20 S. 15th St., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, Ohio.
Republic Iron & Steel Co., Youngstown, Ohio.
Ryerson, Joseph T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.
Snead Architectural Iron Works,
Louisville, Ky.
Union Drawn Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & Railroad Co.,
Brown-Marx Bldg., Birmingham, Ala.
Truscon Steel Co.,
615 Wayne St., Detroit, Mich.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Tool)
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company,
Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Midvale Co., The,
4320 Wissahickon Ave., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.
Vanadium Alloys Steel Co., Latrobe, Pa.

STEEL BELT LACING
Flexible Steel Lacing Co.,
4607 Lexington St., Chicago, Ill.

STEEL BUILDINGS — See BRIDGES, BUILDINGS AND VIADUCTS

STEEL PLATE CONSTRUCTION
Blaw-Knox Co.,
602 Farmers Bank Bldg.,
Pittsburgh, Pa.
Erie City Iron Works, Erie, Pa.
Hammond Iron Works, Warren, Pa.
Heltzel Steel Form & Iron Co., The,
Warren, Ohio.
Hendrick Manufacturing Co.,
Carbondale, Pa.
Pennsylvania Engrg. Works,
New Castle, Pa.
Petroleum Iron Works Co. of Ohio,
Sharon, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh.
Sotter Bros., Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

STEEL PLATES—See PLATES (Iron and Steel)

STEEL STAMPINGS—See STAMPINGS

STEEL STOOLS, CHAIRS, TABLES TRUCKS, BENCH LEGS
Angle Steel Stool Co., Inc., The,
Plainwell, Mich.

STEEL TUBING
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.

STEEL TUBING (Cold Drawn)
Babcock & Wilcox Tube Co.,
Beaver Falls, Pa.
Weldless Tube Co., The, Wooster, Ohio.
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

STEPS (Ladder and Stair, Nonslipping)
Irving Iron Works Co.,
Long Island City, N. Y.

STOKERS
Babcock & Wilcox Co., The,
85 Liberty St., New York.
Hagan Geo. J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.

STOOLS AND FACTORY EQUIPMENT (Steel)
Angle Steel Stool Co., Inc., Plainwell, Mich.
Cleveland Wire Spring Co., The,
1281 E. 38th St. Cleveland, O.

STRAIGHTENING MACHINERY
Shuster, The F. B., Co., New Haven, Conn.
Sutton-Abramsen Engrg. Co., Park Bldg.,
Pittsburgh, Pa.

STRIP MILLS (Hot or Cold)
Treadwell Engineering Co., Eatson, Pa.

STRIP STEEL STRAIGHTENERS
Shuster, The, F. B., & Co.,
New Haven, Conn.

STRIP STEEL (Hot and Cold Roll)
Weirton Steel Co., Weirton, W. Va.

STRUCTURAL IRON AND STEEL—See STEEL (Structural)

SUBWAY GRATING
Irving Iron Works Co.,
Long Island City, N. Y

SULPHURIC ACID
Cleveland-Cliffs Iron Co., Cleveland, O.

SWITCHES (Electric)
Electric Controller & Mfg. Co., Cleveland.

SWITCHES (Track)
Gregg Co., Ltd., The,
67 Wall St., New York, N. Y

SWITCH STANDS
Bethlehem Steel Co., Bethlehem, Pa.

TAGS (Metal Shipping)
Pannier Bros. Stamp Co.,
207-209 Sandusky St., Pittsburgh, Pa.

TANKS (Acid)
Hauser-Stander Tank Co., Cincinnati, O.

TANKS (Air, Gas, Gasoline, Oil and Water)
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

TANKS (Acetylene)
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

TANKS (Storage, Pressure, Riveted, Welded)
Air Tight Steel Tank Co., Pittsburgh, Pa.
Blaw-Knox Co.,
602 Farmers Bank Bldg. Pittsburgh Pa.
Hammond Iron Works Warren Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh.
Sotter Bros. Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

TANKS (Wooden, Acid and Pickling)
Hauser-Stander Tank Co., The,
Cincinnati, O.

TAPPING MACHINES
Taylor-Wilson Mfg. Co.,
McKees Rocks, Pa.

TERNE PLATE
Weirton Steel Co., Weirton, W. Va.

TESTING MACHINES (Pipe)
Taylor-Wilson Mfg. Co.,
McKees Rocks, Pa.

THERMOMETERS (Recording)
Bristol Co., The, Waterbury, Conn.

THREAD CUTTING TOOLS
Landis Machine Co., Waynesboro, Pa.

TIE PLATES
Illinois Steel Co.,
208 S. La Salle St., Chicago, Ill.

TIN PLATE
American Sheet & Tin Plate Co.,
Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Mansfield Sheet & Tin Plate Co.,
Mansfield, Ohio.
Trumbull Steel Co., The, Warren, Ohio.
Weirton Steel Co., Weirton, W. Va.

TIN PLATE MILL EQUIPMENT
Birdsboro Steel Fdy. & Machine Co.,
Birdsboro, Pa.
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Monessen Foundry & Machine Co.,
Monessen, Pa.

TITANIUM
Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

TOOL BITS (High Speed)
Firth-Sterling Steel Co., McKeesport, Pa.

TOOL HOLDERS
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

TOOLS
Cleveland Steel Tool Corp., The,
660 East 82nd St., Cleveland, O.
Ingersoll-Rand Co.,
11 Broadway, New York City.

TOOLS (Hand)
Warren Tool & Forge Co.,
225 Griswold St., Warren, Ohio.

TOOLS (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York.
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.

TOOLS (Portable Electric)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York.

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Oxweld Acetylene Co., Newark, N. J.

TOWERS (Transmission)
American Bridge Co.,
71 Broadway, New York, N. Y.
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.
Pacific Coast Steel Co.,
Rialto Bldg., San Francisco, Cal.

TRACKS (Portable)
Gregg Co., Ltd., The,
67 Wall St., New York, N. Y.

TRANSMISSION MACHINERY
Jones, W. A., Foundry & Machine Co.,
4437 W. Roosevelt St., Chicago, Ill.

TREADS (Nonslipping)
Irving Iron Works Co.,
Long Island City, N. Y.

TROLLEYS
Armington Eng. Co., The, Euclid, Ohio.
Cleveland Crane & Eng. Co., Wickliffe, O.
Euclid Crane & Hoist Co.,
Dept. B, Euclid, Ohio.
Milwaukee Electric Crane & Mfg. Co.,
Milwaukee, Wis.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

TRUCKS (Welding)
Oxweld Acetylene Co., Newark, N. J.

TRUCKS AND TRACTORS (Electric Industrial)
Atlas Car & Mfg. Co.,
1100 Ivanhoe Rd., Cleveland, O.

TUBE MILL MACHINERY
Standard Eng. Co., Ellwood City, Pa.
United Engineering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

TUBES
Babcock & Wilcox Tube Co.,
Beaver Falls, Pa.
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
Johnson-Peter Co.,
51 Terminal Warehouse, Pittsburgh, Pa.
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.

TUBES (Cold Drawn Seamless Steel)
Babcock & Wilcox Tube Co.,
Beaver Falls, Pa.
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.
Weldless Tube Co., The, Wooster, Ohio.

TUBES (Lap-Welded Boiler)
Allegheny Steel Co., Pittsburgh, Pa.
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

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Bourne-Fuller Co., The, Hanna Bldg., Cleveland, O.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Keating, E. F., Co., 446-54 Water St., New York, N. Y.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

TURBINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

TURBO BLOWERS—See BLOWERS

TURNBUCKLES
Merrill Brothers, Maspeth, N. Y.

TURNTABLES
Gregg Co., Ltd., The, 67 Wall St., New York, N. Y.

TURNTABLES (Industrial and Auto)
Canton Foundry & Machine Co., The, Canton, Ohio.

TUYERES
Keystone Bronze Co., 39th St., Pittsburgh, Pa.

TWIST DRILLS—See DRILLS (Twist)

UNIONS (Pipe)
Dart E. M., Co., Providence, R. I.
Illinois Malleable Iron Co., 1801 Diversey Blvd., Chicago, Ill.

USED AND REBUILT EQUIPMENT
See Page 91.

USED AND REBUILT MACHINERY
Niles-Bement-Pond Co., 111 Broadway, New York, N. Y.

VALVES
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

VALVES (Back Pressure)
Oxweld Acetylene Co., Newark, N. J.

VALVES (Gas and Air Reversing)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
McKee, Willis, 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.

VALVES (Gate, Brass, Iron, Steel)
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

VALVES (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

VALVES (Water Cooled)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

VALVES AND FITTINGS
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.
Jenkins Brothers, 80 White St., New York, N. Y.
Pittsburgh Valve, Fdry & Construction Co., 26th & A. V. R. R., Pittsburgh, Pa.
Powell, Wm., Co., 1212 Draper St., Cincinnati, O.

VANADIUM
Vanadium Corp. of America, 120 Broadway, New York, N. Y.

VIADUCTS (Steel)—See BRIDGES, BUILDINGS AND VIADUCTS

VISES
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

WAREHOUSES (Iron and Steel)
Bourne-Fuller Co., The, Hanna Bldg., Cleveland, O.
Illinois Steel Warehouse Co., 208 So. La Salle St., Chicago, Ill.
McCalla, Harold, Co., The, Beach St. and E. Columbia Ave., Philadelphia, Pa.

WASHERS
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

WASHERS (Brass and Bronze)
Everitt Co., The, 271 Franklin St., Boston, Mass.

WASHERS (Iron and Steel)
Allegheny Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bettcher Stamping & Mfg. Co., 3106 W. 61st St., Cleveland, O.

WASHERS (Leather)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

WASHING MATERIAL (Rags)
Ford, J. B., Co., The, Wyandotte, Mich.

WAX (Pattern-Vent-Wire)
United Compound Co., 225 Elk St., Buffalo, N. Y.

WEDGES (Journal Bearing—R. R.)
Pollak Steel Co., Cincinnati, O.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

WELDED HEADERS
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna, Pittsburgh, Pa.

WELDING (Forge and Hammer)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

WELDING (Plastic-Arc)
Wilson Welder & Metals Co., 132 King St., New York, N. Y.

WELDING AND CUTTING APPARATUS (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilson Welder & Metals Co., 132 King St., New York, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.
Davis-Bournonville Co., The, (Air Reduction Sales Co.) 342 Madison Ave., New York, N. Y.
International Oxygen Co., Newark, N. J.
Oxweld Acetylene Co., Newark, N. J.

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Presto-O-Lite Co., Inc., The, Indianapolis, Ind.

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WELDING GLASSES
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Roebling's, John A., Sons Co., Trenton, N. J.

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Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Stroh Steel Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.

WINDOW CLEANING MATERIAL
Skybrite Co., The, Keith Bldg., Cleveland, O.

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Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Interstate Iron & Steel Co., 104 So. Michigan Ave., Chicago, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
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Washburn Wire Co., Inc., 118th & Harlem River, New York, N. Y.

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Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.

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WIRE NAILS—See NAILS

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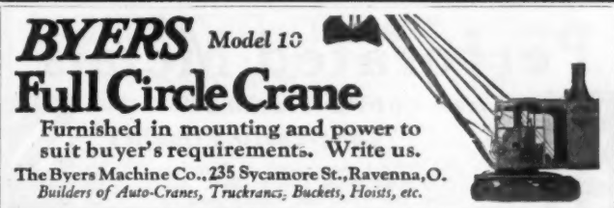

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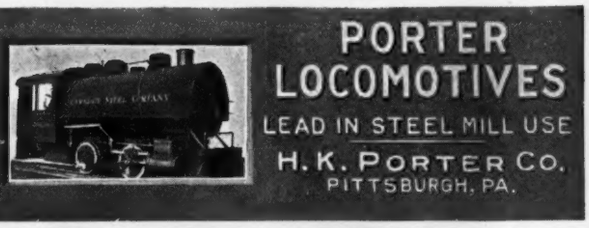
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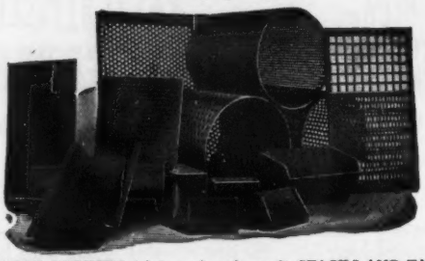

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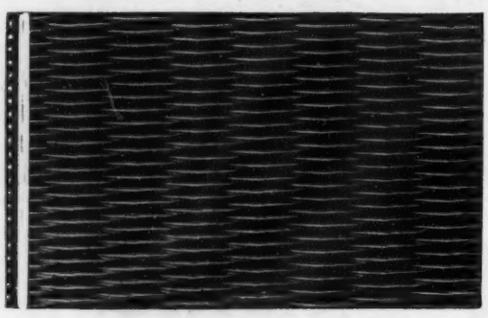

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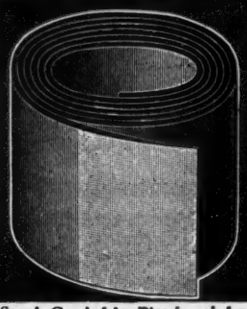

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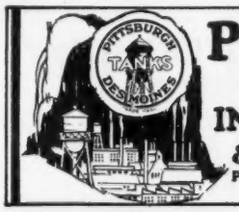

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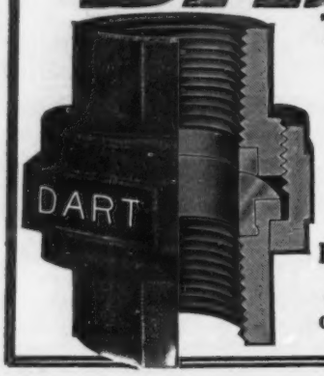

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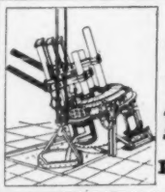

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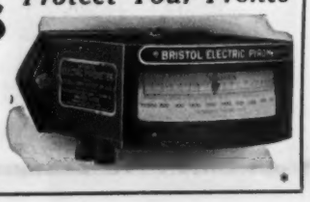

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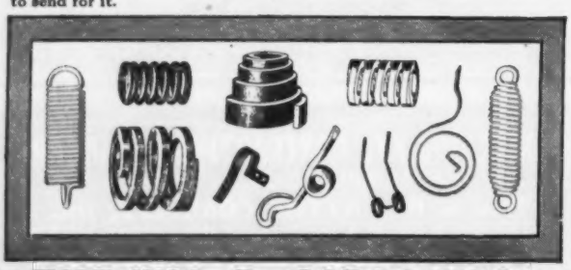

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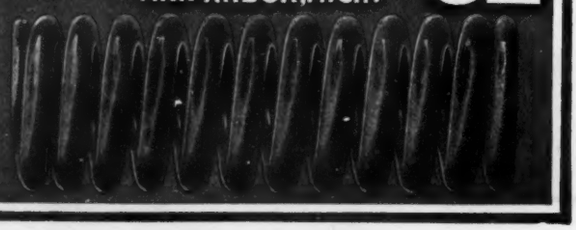

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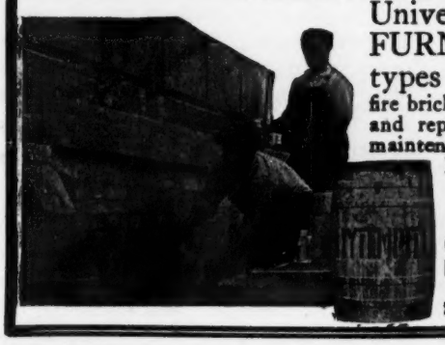

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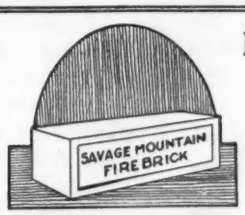

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IRON TRADE REVIEW

Resale Equipment News

Current Announcements and News of Plant Liquidations, Public Auctions of Equipment, Proposals, Bids, Sales, Etc.

December 27, 1923

MACHINE tools and miscellaneous shop equipment will be auctioned at the army supply base, at Boston, on Jan. 17, it is announced by the war department. Among the articles to be sold will be drill presses, milling machines, electric furnaces, grinders, drop hammers, lathes, screw machines, motors and heat treating furnaces. Catalogs may be obtained from the quartermaster supply office, First avenue and Fifty-ninth street, Brooklyn, N. Y., or from the office of the commanding officer, Army Supply base, Boston.

* * *

The factory of the Wald Mfg. Co., Sheboygan, Wis., is offered for sale. The plant has 32,000 feet of floor space with a site of 400 x 400 feet. The factory and headquarters of the company will be moved to Maysville, Ky., after the first of the year.

* * *

The plant and equipment of the New Haven Copper Co., Seymour, Conn., has been sold, but the new owners have not been divulged. According to John H. Lancaster, managing director of the company, a complete turnover of the stock to the new interests has been made.

* * *

The Penn Metal Co., Boston, has purchased the machinery and equipment of the Dexter Metal Mfg. Co., Philadelphia, manufactured of steel shelving, metal lockers and steel equipment. Additions will be made to the factory of the Penn Metal Co., and the machinery of the Decter Metal Mfg. Co. will be installed after the first of the year.

* * *

An auction sale of a modern steel casting plant and machine shop located at Green Island, Troy, N. Y., will be held on Jan. 24. The equipment of the foundry consists of three electric furnaces, sand blast, annealing furnace, etc., while over 50 machines will be sold from the machine shop, including lathes, milling machines, grinders, turret lathes, drill presses, etc. Other property to be disposed of consists of a heat treating department, a large quantity of raw materials, complete office equipment, and real estate. The sale is in charge of Thos. O'Conner, Waterford, N. Y.

* * *

Auction sale of the Warren Metallic Bed Co., Warren, O., manufacturers of steel and brass beds and of the Phoenix Tube Co., Warren, manufacturers of steel and brass tubing will be held at the plants on Jan. 3. The material to be sold includes 860 brass beds, $30,000 stock of brass trimmings, 170,000 pounds of rolled steel, 65,000 feet of lock joint tubing. Charles D. Todd, 4442 Engineers building, Cleveland, is the auctioneer. It has not been decided whether or not the machinery will be sold at this time.

* * *

Announcement has been made of the receivers sale of the plant of the Daniels Motor Co., Reading, Pa., on Monday and Tuesday, Jan. 14 and 15, the auction to be conducted on the premises. Besides the real estate which includes a 4-story brick building and power plant, there will be sold the patterns, patents, jigs, dies, tools, machinery and other equipment. The machinery consists of practically new plain and vertical millers, lathes, radial drills, grinders of various types, turret lathes, gear hobbers, shapers, etc. Other miscellaneous equipment consists of blacksmith shop tools, small tools, a nickel plating outfit, woodworking equipment, including boring machines, shapers, planers, and saws. Stock of fixtures comprising sheet steel and aluminum, nuts, bolts, and also the office equipment will be sold. Samuel T. Freeman & Co., 1519-21 Chestnut street, Philadelphia, are the auctioneers.

* * *

Purchase of the plant at Langueuil, Que., of the Armstrong Whitworth of Canada, Ltd., has been made by Charles Walmsley & Co., (Canada), Ltd. The plant has been taken over and converted from a steel plant to the manufacture of paper and pulp mill machinery.

Sales Calendar

Jan. 3.—Sale of the plants of the Metallic Bed Co., Warren, O. and the Phenix Tube Co., Warren. Charles D. Todd, 442 Engineers building, Cleveland, is the auctioneer.

Jan. 7—Beginning of the sale of the Harroun Motor Car Co., Wayne, Mich. Marshall & Huschart Machinery Co., 17 South Jefferson street, Chicago, are the auctioneers.

Jan. 9-10—Auction sale of the machinery and equipment of the Stevens-Duryea Automobile Co., Springfield, Chicopee Falls, Mass. Herbert Segal, Newark, N. J. is the auctioneer.

Jan. 14-15—Auction sale of the plant and equipment of the Daniels Motor Co., Reading, Pa. Samuel T. Freeman, Philadelphia, is the auctioneer.

Jan. 15—Bids will be received for the machinery and equipment of the Skinner & Eddy shipyard No. 2, Seattle, Wash., by the shipping board, Washington.

Jan. 17—Auction of miscellaneous machine shop equipment at the army supply base, Boston. Information can be obtained from the quartermaster supply office, First avenue and Fifty-ninth street, Brooklyn, N. Y.

Jan. 22—Sale of the surplus machinery of the J. H. Williams & Co., Brooklyn, N. Y. Charles Kriser is the auctioneer.

Jan. 24—Auction sale of a modern steel casting plant and machine shop located at Green Island, Troy, N. Y. Thos. O'Connor, Waterford, N. Y., is in charge.

Jan. 31—Bids will close on the plant of the Hercules Steel Casting Co., Milwaukee. E. L. Cullen, 871 Robinson avenue, Milwaukee, is receiver.

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Morey & Co., Inc. 92

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Press, Punch, No. 6½ Toledo O.B.I. Gd.,
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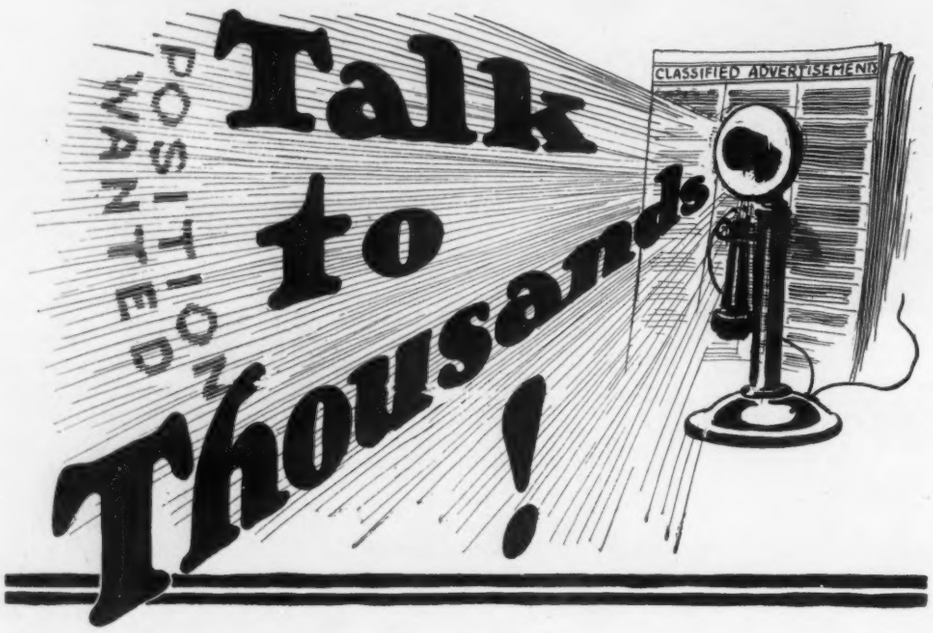

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3" Jones & Lamson, G.H., Double Spindle.
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2¾"-3¼" Cleveland Model A Automatic Screw Machine

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30" x 30" x 6' Gray Planer, 1 head
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Low Prices

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32" Hoeffer, Sliding Head
34" Baker Bros., No. 416 Heavy Duty
40" Aurora, Sliding Head
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No. 11 Pratt & Whitney 12-spindle Multiple
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2½' Fosdick, Plain Radial
3' Morris, Plain Radial
3½' Fosdick, Plain Radial
4' Bickford, Plain Radial
4½' Niles, Half Universal

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No. 2 Lea, Universal
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12" x 2" Landis, Plain
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54" Besley, Vertical Disc

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30" x 12" Rhenania, Gear Hobber

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36" x 36" x 10' Pond, 2 heads.
32" x 32" x 8' Pond, 2 heads.
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24" x 24" x 4' Wheeler, 1 head.
24" x 24" x 6' Cincinnati, 2 heads.
24" x 24" x 8' Pratt & Whitney, 1 head.
24" x 24" x 10' Powell, 1 head.
24" x 24" x 12' Pratt & Whitney, 1 head.
and four others 16" to 22" from 4' to 6' platen.

MILLERS

2—No. 2A Hendey Universal, with dividing head, vise, chuck.
2—No. 2 Milwaukee Plain, with dividing head, vise, chuck.
No. 3 Milwaukee Universal, with dividing head vise.
No. 3 Cincinnati, Plain, with dividing head, vise, chuck.
No. 2 Cincinnati Plain, with dividing head, vise, chuck.
No. 4 and No. 6 Becker Vertical.
3—No. 5 Brown & Sharpe, Vertical.
Also 15 more Hendey, Brown & Sharpe & Chicago; Plain, Universal and Hand.

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(Power, Hydraulic and Arbor)

No. 20 Bliss Inclinable Press.
3—Farrel, 6" stroke Stamping Press.
Screw Straightening Press.
Nos. 1 to 3½ Greenerd Arbor Presses.
10—10 tons to 225 tons Watson-Stillman Vertical Hydraulic Presses.

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New No. 61 Fellows Gear Shaper.
2—36" Fellows Gear Shaper.
24" Fellows Gear Shaper.
9" Pratt & Whitney, with vise.
12" Pratt & Whitney, with vise.
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5—14" Pratt & Whitney, with vise.
2—16" Pratt & Whitney, with vise.
2—16" Ohio, with vise.
16" Smith & Mills, with vise.
20" Smith & Mills, with vise.
3—Fitchburg and Pratt & Whitney Traveling Head.

GRINDERS

2—No. 2 Cincinnati Universal.
No. 2 Brown & Sharpe Surface.
2—No. 2 Brown & Sharpe Plain.
Pratt & Whitney Surface.
No. 160 Heald Surface.
Norton Universal Tool-Room.
No. 4 Besley Disc.
20 Modern, Brown & Sharpe, Norton, Pratt & Whitney, Diamond & Washburn.

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No. 4—48" Brown & Sharpe Gear Cutter.
24" Brown & Sharpe Spur and Bevel Gear Cutter.

DRILLS

20" Baker Heavy Duty.
24" Baker "F" Heavy Duty.
20", 22", 24", 25", 26", 28", 36" and 42" plain and back geared, stationary and sliding heads —Makers, Snyder, Prentice, Niles, Aurora, Hamilton. 4 to 20 spindle Multiple, Makers Western, Pratt & Whitney, Foote-Burt and Baush.

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6 ft. Pond, plain.
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No. 1 Baker, with countershaft.
No. 2 Morton, with countershaft.

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Rockford, Betts, Beaman & Smith and Niles-Bement-Pond.

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30—Direct Current, ½, ¾, 1, 2, 3, 5, 6, 7½, 10, 15, 20, 35, 50, 55, 75, and 80 Horse Power, General Electric, Robbins & Meyer, Sprague, Wagner Crocket-Wheeler, Allis-Chalmers, Westinghouse and Eddy—Also Generators of the above manufacture.

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Betts, Pratt & Whitney and Bement-Miles, from 6 inches to 30 inches.

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25—Approx. 8000 Gallon

CAR TANKS

tested 60 lbs.

Also desirable sizes both used and new

Tanks from 400 to 26,000 gals. in process of manufacture for early delivery.

Shippers' Car Line, Inc.
165 Broadway, New York

POWER PLANT EQUIPMENT

CORLISS ENGINE (HAMILTON TYPE)
400 H.P. 26 x 42
85 R.P.M.
125 lbs. Steam Pressure
Rope Drive Sheave on Engine 14' 10".
Sheave on Jack Shaft 56" dia. 6 inch bore.
Complete with slack rope device and electrical safety stop.

TWO WESTINGHOUSE (550 VOLT D.C.) GENERATORS
200 K.W. 400 Amperes—510 R.P.M.
34.5 inch Pulley with 33 inch face.
Each of the above Generators have Generator Panel with Rheostat, Volt Meter and Ammeters, also two panels equipped for two circuits each.

ONE HERRON & BURY MFG. CO. AIR COMPRESSOR
Class—CCS
Size 10 x 16 x 10 x 10
Number 326
Three Clutches—The Clutches are in good condition and will transmit at least 400 H.P.
Eight Pedestals with Bearings, Floor type with bearings for 6 inch shaft. The above can be seen at our plant.

The Morgan Engineering Company
Alliance, Ohio

Motors from Stock

150—Slightly Used Motors, 3 ph., 60 cy., 440 v., 7½-75 h.p., General Electric, Allis-Chalmers and Westinghouse.

1—150 H.P., 2200 Volt, 1800 R.P.M., Westinghouse Motors.

2—300 H.P., 2200 Volt, 1200 R.P.M., G. E. Motors.

All motors guaranteed to be in good serviceable condition.

OLD HICKORY POWDER PLANT
Old Hickory, Tennessee

CORLISS ENGINES

18 x 36 Heavy Duty
New and like new
Specifications and drawings sent upon request to owner.

ROY BRENHOLTS, Trustee
44 E. Broad St. Columbus, O.

STIRLING BOILERS

823 Horse Power

Class M-30 823 H.P. Babcock and Wilcox Stirling Water Tube Boilers, 200 lbs. pressure. Drums double riveted, double strap butt joint, complete with Westinghouse stokers, forced draft fans, vulcan soot blowers and all accessories. Operated less than 90 days. Inspection invited.

Send for specification folder.

OLD HICKORY POWDER PLANT
Old Hickory, Tennessee

For Sale NEW SURFACE CONDENSERS

In perfect condition at 1/6 of manufacturing cost. For further details, write to

Tube Conversion Company
215 Broadway, New York, N. Y.
Telephone: Whitehall 6352

NEW AND USED SCALES

Howe and Fairbanks Scales, 600 pounds to 100 tons capacity. Platform, floor, warehouse, miners and transportation, truck and spiral types. Write for Prices and Specifications.

OLD HICKORY POWDER PLANT
Old Hickory, Tennessee

8000 ELECTRICAL UNITS IN STOCK!

Quick delivery is insured on motors, generators, transformers, etc. New and rebuilt equipment guaranteed and priced to save you money. Write for Bulletin.

THE FUERST-FRIEDMAN CO., Cleveland, O.

350 H. P. Corliss Engines

All in first class condition

10—Allis-Chalmers 18" x 36", 350 H.P. Corliss Engines. Heavy Duty Mill Type. Double Eccentric. Crown face fly wheel 11 ft. diameter by 32 in. face. Complete with Richardson-Phenix oil filtration and lubricating system. Both right and left hand available.

Let us send you specifications and quotations.

OLD HICKORY POWDER PLANT
Old Hickory, Tennessee

"GET ACQUAINTED"

with the influential classified-ad service of IRON TRADE REVIEW.

Use it to find buyers for your "outgrown" machinery and to locate equipment that you may require.

What department of your plant is idle? You can secure the orders you want through an ad in the Fill-In and Contract Work section.

Through the Employment page you can readily find an experienced man for any vacancy in your plant.

In fact, this service is capable of handling your wants in every way and is ready to serve you at all times.

624

Rails and Mine Cars

Rails—all Sections—New and Relaying. Also Frogs and Switches. Bridge Girders and I-Beams, all sizes. New Mine Cars of most all gauges in stock for immediate shipment.

M. K. FRANK
Union Trust Bldg., Pittsburgh, Pa.

Washing and Drying Machines for sale

One No. 14 "Ideal" Continuous Process Washing and Drying Machine with Power Loader, 10' 0" Screen.

Also one No. 3 "Ideal" Continuous Process Washing and Drying Machine without the Power Loader, 8' 0" Screen. Built by Ideal Concrete Machinery Co.

Russell, Burdsall & Ward Bolt & Nut Co.
Port Chester, New York

One Detroit

Rocking Electric Furnace

Practically New

1-ton Capacity. Includes Transformer, all auxiliary equipment and one new lining.

One 60" Schwartz
Oil Burning Brass Furnace

American Manganese Bronze Company
Holmesburg, PHILA., PA.

Tools For Immediate Shipment

1—No. 3-A Warner-Swasey Hollow Hexagon Turret.
1—28" Gisholt Turret
1—1½" Dreses Geared Friction Head Screw Machine.
1—1¼" Gridley Single Spindle Automatic.
1—61" Bullard Maxi-Mill.
1—54" Bullard Rapid Production Mill.
1—8' Bickford Vertical, two heads, with motors.
1—96-H Gould-Eberhardt Auto. Gear Hobber.
1—92" x 20' Fitchburg Lathe.
1—72" x 56' Niles-Bement-Pond Forge Lathe.
1—42" Niles-Bement-Pond Car Wheel Lathe
1—48" x 15' Niles-Bement-Pond Screw Cutting Lathe, cone drive.
1—New—36" x 34' Bridgeford Extra Heavy Geared Head
1—36" x 18' Bridgeford Geared Head, M. D.
1—36" x 16' Niles-Bement-Pond Motor Drive.
1—30" x 42' LeBlonde, with Motor, Tapping Attachment.
1—27" x 15' Bridgeford Center Drive Double End Axle Lathe.
2—26" x 22' Boye-Emmes, with Motor, Taper Attachment.
1—No. 2 Geared Spindle Hendey Univ. Miller, Univ. Equipment
2—No. 3 Standard Univ. Geared Head Cincinnati Miller.
1—No. 4 Cincinnati Plain, S. P. D.
1—6' Western Triple Geared Heavy Type Plain, Tapping Attachment.
1—5' Bickford Plain Radial, Tapping Attachment.
1—12-spindle Bausch Drill, type 24-C.
1—112" Pond Radial, Motor Drive.
5—General Electric Storage Battery Locomotives, Type CSB.
1—1½" Acme Six Spindle Semi-Auto Nut Tapper.
1—Six Spindle Acme Nut Tapper, latest type.
1—84" x 84" x 20' Betts Heavy Duty Planer, 4 heads.
1—60" x 60" x 14' Powell Planer, two heads.
1—12" x 36" Modern Grinder, self-contained.
1—No. 2 Cincinnati Univ. Tool-Cutter Grinder.

Write for Simmons Pictorial News

SIMMONS Machine Tool Corporation ALBANY

Branch Offices and Warehouses in New York City and Buffalo

PRESSES

No. 59¾ Toledo S.S. Double Geared.
No. 95 C Toledo S.S. Double Crank Geared.
No. 94 C Toledo S.S. Double Crank Geared.
No. 57 Toledo S.S. Single Crank Plain.
No. 55 Toledo S.S. Single Crank Plain.
No. 52 Toledo Arch Single Crank Geared.
No. 35 Toledo Solid Back Geared.
No. 34 Toledo Solid Back Plain.
P. G.-5 Ferrecute Solid Back Geared and many others of all kinds.

Riverside Machinery Depot
251 St. Aubin Avenue
Detroit, Michigan

HAMMERS
Steam Drop

2500 lb. Erie.
5000 lb. Chambersburg.
12000 lb. Chambersburg.

PRESSES

No. 59 Toledo, Back Geared.
No. 57 Toledo, geared.
250 Ton, Chambersburg, Hydraulic.

BULLDOZERS

No. 8 W-W Friction Clutch Pulley.
No. 7 W-W Friction Clutch Pulley.
Must be moved. Prices low for quick sale.

MARR-GALBREATH MACHINERY CO.
127-129 Water St PITTSBURGH, PA.

14' NILES
SLOTTER
$700.00

Miles Machinery Co.
Saginaw, Mich.

J. E. HAETTEN & CO., Inc.
50 Church Street, New York City
Cortland 2691

"The Best For Less"

40—No. 70 Heald Internal Grinders, good working condition. Price $275.00 each, f. o. b. warehouse, Newark, N. J.

MISCELLANEOUS

Chicago Duplex Compressor, 690 cu. ft.
Bullard 42" Rapid Production Boring Mill.
Williams & White No. 2 and No. 5 Bulldozers.
Panama 2-Ton Portable Floor Cranes.
Champion 20"-22" Back Geared Drills.
Baush 9', Pond 6½'-8' Radial Drills.
Ott 6" x 6" Internal Grinding Machine.
Brown & Sharpe No. 13 Automatic Gear Cutters.
Jones-Lamson 2¼" x 24", 3 x 36" Flat Tur. Lathes.
Brown & Sharpe No. 2-B Pl., Cincinnati No. 3-S, No. 2 Universal and No. 2 Vertical Millers.
Lodge & Shipley 30" x 18' Lathe, S.P.D.
Cleveland Openside Planer 48" x 48" x 16' 2"
Sellers Planer 120" x 120" x 25', 4 heads.
Bliss No. 76½ S.S. Dbl. Grd. Tie Rod Press.
Reade Punch & Shear 50" thr., cap. 2" x 1".
Acme Screw Machine 1" x 7".

RUSSELL MACHINE COMPANY
PITTSBURGH, PA.

When you offer a planer, miller, grinder or any equipment for sale through the Used and Rebuilt Equipment Section you are insured of direct, concentrated effort.

Your advertisement in this department is put on the desks of more than 34,000 executives. Time and again many of these have expressed their satisfaction in having at their finger tips such a complete used machinery reference to depend upon.

What have you to offer these buyers?

Send us your list for insertion in the next issue.

625

We have just secured and are offering at an attractive price

ONE 5" AJAX FORGING MACHINE

Purchased new in 1918
Modern type and design
Steel bed and steel gears
Twin gear drive, double flywheel
Die height 22"
Die opening 5¾"
Stock gather 8"
Die and tool space, slide forward 28"
Header slide stroke 15½"
Speed 34 strokes per minute
Single and double high tool holders
Arranged for motor drive.

This tool was operated only intermittently during a period of two years and is in excellent condition. At the price we are quoting, you cannot afford to overlook this opportunity if you can use a **Forging Machine** *of this size to advantage.*

F. H. Crawford & Co.
299 Broadway New York City

All High Class TOOLS

16" Gould & Eberhardt Crank Shaper..$700.00
16" Davis Geared Crank Shaper.....$425.00
20" American Geared Crank Shaper....$750.00
18" x 8' Reed Prentice Geared Head Motor Drive Lathe.....$575.00
14" x 6' Canedy-Otto Lathe, compound rest.....$300.00
21" x 8' Heavy Duty Turning Lathe...$200.00
No. 1 Garvin Universal Milling Machine$325.00
No. 1½ Brown & Sharpe Plain Milling Machine, late type.....$575.00
No. 3 Brown & Sharpe Plain Milling Machine, late type.....$725.00
26" x 26" x 6' Pond Planer.....$500.00
No. 00 Brown & Sharpe Full Automatic Screw Machines, (rebuilt).....$550.00
Farrel Foundry Single Action Punch Presses, weight (about 1600 lbs.)...$200.00
3' Fosdick Plain Radial Drill, tapping attachment.....$575.00
6' Bickford Universal Radial Drill....$1000.00

J. L. LUCAS & SON Inc
LUCAS MACHINERY SERVICE
BRIDGEPORT, CONN.

Equipment Wanted

For Machine Shops, Foundries, Iron and Steel Works, Mines, Railroads and Metal-Working Plants Generally

Advertising Rates: 1" One Time $5.00; 2" One Time $9.50; 3" One Time $14.00; 4" One Time $18.00.
RATES FOR LARGER SPACE OR LONGER PERIODS FURNISHED ON REQUEST

Wanted for Immediate Shipment

Either new or second hand, one hydraulic stake riveter about 12' 6" stake for 1500 lb. pressure, capacity up to 1¼" rivets.

Also 100 K.W. 220 volt 60 cycle 3 phase generator with steam engine suitable to drive above generator either direct connected or belt.

THE McNEIL BOILER COMPANY
Akron, Ohio

WANTED

STEEL SHEET PILING

300 pcs. Lackawanna 14" arch web 30-35 ft. long. Address Box 938, IRON TRADE REVIEW, Cleveland.

We want a 20-ton
Suspended Crane Scale
New or Used—First class Condition

Ferguson & Langc Foundry Co.,
1039-65 Willow St., Chicago, Ill.

Only One Inch!

and yet how effective this small space is for the advertising of surplus machinery! $5.00 one time; $4.75 per insertion for three times.

605

Mr. Manufacturer

Remember

IRON TRADE REVIEW
Classified-Ad Service

When you are seeking competent men the "Employment" Department will give you quick Classified-Ad Service in helping you pick the right man.

618

A single inquiry often results in a STEADY CUSTOMER

Advertise in the
Fill-In and Contract Work Section
of
IRON TRADE REVIEW

640

Use the modern method—a classified advertisement

Opportunities

Advertisements in this section are referred to by those seeking plants and plant sites, miscellaneous semi-finished and finished raw materials; by those who desire agencies.

Advertising Rates: 1" One Time $5.00; 2" One Time $9.50; 3" One Time $14.00; 4" One Time $18.00.

FOR SALE

STEEL SHEET PILING

230 pcs. 50-55 ft. Lackawanna 14" x 3/8" arch web. Will cut to shorter lengths.

1500 pcs. 20-23 ft. Lackawanna 8½".

Address Box 937, Iron Trade Review, Cleveland.

For Sale or Rent

GRAY IRON FOUNDRY

Size 110 by 220. Brick and Steel construction. Ten acres ground. Side track. Located 125 miles north of Chicago. Built 1920. Address Box 952, IRON TRADE REVIEW, Cleveland.

A manufacturing interest with large plants in New England and the Middle West and with a surplus of floor space and equipment, would give consideration to the manufacture of mechanisms or devices of metal, preferably of a patentable nature, wherein a large volume of trade can be established, if properly handled.

Address Box 902,
IRON TRADE REVIEW, Cleveland

AUCTION SALE: Modern Steel Casting Plant and Machine Shop

Ready to Operate
Located at Green Island, Troy, N. Y.
Sale January 24, 1924, at 2 P. M., at the Plant.

Property sold in parcels or all together.

Parcel No. 1 consists of real estate, leases, trackage rights, option for additional lands and buildings, and to include crane and tools connected therewith, heating apparatus, electric wiring and fixtures and plumbing.

Parcel No. 2 consists of all other property on the plant which includes the following items:

FOUNDRY, fully equipped including three ELECTRIC MELTING FURNACES, sand blast, annealing furnaces, etc.

MACHINE SHOP with up-to-date individual motor driven machines over 50 in number including:
HENDEY LATHES
MILWAUKEE MILLING MACHINES
CINCINNATI GRINDERS
WARNER & SWASEY TURRET LATHES
BLANCHARD SURFACE GRINDER
HENDY SHAPERS, DRILL PRESSES, TOOL AND CUTTER GRINDERS, ETC.

HEAT TREATING department consisting of twelve gas fired furnaces for general heat treating and high speed tool work.

MATERIALS, a large quantity of raw materials.

LABORATORIES, completely equipped for chemical and physical testing, including metallurgical, microscope, Rihle tensile testing machine of 150,000 lbs. capacity, Brinell tester, Charpy impact testing machine, etc.

OFFICE completely furnished in every detail, well lighted and heated.

Parcel No. 3 consists of patents, applications for patents in the United States and foreign Countries relative to the production of high speed steel, directly from the molten alloy by casting in the general form for use without the preliminary casting in the ingot and forging to form.

Parcel No. 4 shall consist of all the property above.

The property shall be sold first in separate parcels 1, 2, and 3 and then as a unit under Parcel 4 and whichever produces the largest sum will be accepted, subject to approval of the Court.

Further details furnished on request.

SHIPPING FACILITIES, D. & H.; N. Y. C. R. R.; Hudson River.

INSPECTION. Open to, at any time.

THOS. O'CONNOR, Waterford, N. Y.

Help! Help!

When in need of it, insert an ad in the Employment Section IRON TRADE REVIEW. It will put you in touch with the most capable men obtainable.

603

OPPORTUNITY

To Purchase or Lease under Favorable Terms

Modern Electric Steel Foundry

Located at Hartford, Conn., in the

Center of the New England Market

completely equipped, including 2 Heroult 2 Ton Furnaces—Electric annealing and core ovens—5 Electric Cranes—Sand-blast—Grinding and Welding equipment—Steel Flasks—Molding Machines—Pattern Shop and Storage—R. R. Siding—44,000 sq. ft. Floor Space—Low Power Rates—Cheap Scrap—Open Shop Conditions.

Address

THE HARTFORD ELECTRIC LIGHT CO.
Hartford, Conn.

Want to sell your plant?
Secure an agency, capital?
Sell or buy material?

Remember

Iron Trade Review

Classified-Ad Service

Executives in metal-working industrial plants depend on the Classified-Ad Service offered through the "Opportunities" Department when seeking plant facilities, representatives, raw and semi-finished materials in job lots.

621

GALVANIZED CORRUGATED SHEET STEEL

Carload—Less Carload

Stock shipment below mill prices in 2½" and 1¼" Corrugations. In either stock lengths or odd lengths 120" long or under. Gauges from 18 to 28 inclusive.

AMERICAN STEEL BAND CO.
N. S. Pittsburgh, Pa.

Money to Invest?

Many organizations are seeking additional capital for expansion. An ad in the Opportunities Section will find you a good proposition.

602

Today's opportunities are tomorrow's sales

Employment

POSITIONS OFFERED Minimum ad., 50 words, $3.00 Additional words, $.06 each

When a box address is desired, count seven words in addition to your copy

POSITIONS WANTED Minimum ad., 30 words, $1.00 Additional words, $.03 each

Positions Offered

ENAMEL MIXER WHO KNOWS THE business thoroughly in making and applying first coat and enamel on cast iron sanitary ware. Only those who are experienced in the line need apply.

No attention paid unless full information given as to age, nationality, experience, where worked, married or single, references, salary desired, and how soon available.

Excellent opportunity for the right man. Address Box 962, IRON TRADE REVIEW, Cleveland.

SALES CORRESPONDENT

We want a live, technical sales correspondent —who likes a good, fair, hard business fight. If you are willing to work hard in order to make good, we've got the job you want. Requirements—technically trained, preferably with metallurgical knowledge, and plant experience and the ability to write a good, clear letter. Pittsburgh district. Address Box 955, IRON TRADE REVIEW, Cleveland.

WANTED:—ASSISTANT FOUNDRY Foreman not over 35 years of age for large Steel Foundry in Pittsburgh District. Must be first class mechanic, fairly familiar with manufacture of Rolling Mill equipment. Good opportunity for man to advance to position of General Foundry Foreman. Address Box 960, IRON TRADE REVIEW, Cleveland.

DISTRICT SALES MANAGER

We have openings for District Sales Managers in each of the following territories: New York, Cincinnati, Cleveland and Detroit, also for an Assistant District Sales Manager in Chicago.

Our product is patented, widely advertised and has a broad field. Our main outlet at present is through users of industrial furnaces and heat enduring alloys. Some knowledge of combustion will be an assistance but it not absolutely necessary.

We have no use for "arm chair" salesmen. We need men who have a broad acquaintance among the operating executives of the industries in their territory and are accustomed to hustle for business from morning to night.

Our straightforward bonus system will enable the right man to double a liberal salary almost from the start.

Address Box 954,
IRON TRADE REVIEW, Cleveland

FOUNDRY FOREMAN TO TAKE FULL charge of plant making cast iron enameled sanitary ware.

Only those who are thoroughly familiar with, and have a good reputation in this line need apply.

No attention paid unless full information given concerning age, nationality, experience, where worked, married or single, references, salary desired, and how soon available.

To the right man, who can make good, this is an excellent opportunity.

Address Box 961, IRON TRADE REVIEW, Cleveland.

WANTED:—HIGH GRADE SALESMEN and Sales Agents capable of representing a nationally known quality brand of technical Paint Specialties, exclusively or in conjunction with some other line, on a strictly commission basis. Full information as to experience, present connections and references required. Address Box 927, IRON TRADE REVIEW, Cleveland.

Positions Offered

THE MANAGER OF A LARGE PLANT, producing special sheets in the Tristate District, needs an Assistant to work on personal assignments. A man with some operating experience in Sheet Mill and Steel Plant is wanted. He should be able to analyze cost and practice reports; devise clerical systems; investigate manufacturing methods and prepare graphic or tabular summarized reports. Address Box 956, IRON TRADE REVIEW, Cleveland.

WANTED

Chief Inspector

For large steel plant

Applicant must be experienced and fully qualified. Experience in the inspection of special and alloy steels desired. Opportunity unlimited. Write giving full information as to experience, age, references and salary expected.

Address Box 959
IRON TRADE REVIEW, Cleveland.

EVER-TYTE AND ZELCO PISTON rings with patented Zelco Process save Gasoline, Oil, increase capacity, prevent cylinders from wearing out of round, lessen Carbon; after using make arrangement with us to sell them; are looking for distributors with mechanical knowledge; made up to 80 inch; used in Locomotives, Boats, Engines, Compressors, Ice Machines, Pumps, Trucks, Tractors, etc.; real opportunity; all or part time. Ever-Tyte, St. Louis.

What do you need?

Remember

IRON TRADE REVIEW
Classified-Ad Service

Present your wants to our thousands of readers through an ad in the "Equipment Wanted" Department and you will quickly see what Classified-Ad Service means in results.

622

Positions Wanted

A FIRST CLASS BLAST FURNACE SUperintendent is seeking employment with any reliable company. Address Box 911, IRON TRADE REVIEW, Cleveland.

RESEARCH, ADVERTISING OR WRITing up and editing treatises on engineering and industrial subjects. Graduate engineer with ten years experience in installation and maintenance of plant equipment and three years in editing of treatises on engineering and industrial subjects. Seeks opportunity as director of research or advertising engineer, where his accumulated knowledge and experience may be put to best use. Address Box 958, IRON TRADE REVIEW, Cleveland.

STEEL FOUNDRY MANAGER

Now ready to confer with interested parties wanting a real executive who knows how to produce castings and market them. Theoretrical and practical experience with open hearth, electric and converter processes. Carbon, manganese and alloys steel; capable of handling a big job. Get results and systematize without excess of red tape. Want interview with bankers having foundries under unsatisfactory management. Address Box 948, IRON TRADE REVIEW, Cleveland.

MANAGER-BUYER CAPABLE HANdling any department Manufacturing business. Extensive buying experience, Pig Iron, Copper, Steel and Metal products. Good organizer. Might invest. Address Box 942, IRON TRADE REVIEW, Cleveland.

Employment Service

THE BEST WAY TO GET A GOOD position in drafting or engineering is to file application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and ilst of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

WE ARE THOROUGHLY EQUIPPED to supply steel mills, foundries, contractors of construction, mines and railroad with mechanics of all kinds, handymen or laborers for any type of work. A trial will convince you that we are capable and exact in selecting first-class efficient employees. Industrial Employment Service, 603 Superior Ave., N. W., Cleveland, Ohio.

SALARIED POSITIONS $2,500 TO $25,000 upward; executive, technical, administrative, engineering, manufacturing, professional, managing, financial, etc., all lines. If you are qualified and receptive to tentative offers for a new connection, you are invited to communicate in strict confidence with the undersigned, who will conduct preliminary negotiations for such positions. A method is provided through which you may receive overtures in confidence, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Send name and address only; preliminary particulars will be sent without obligating or compromising you in any way. R. W. Bixby, Inc., 416 Lockwood building, Buffalo, N. Y.

Fill-in and Contract Work

Buyers refer to the cards in this section when they have orders to place for castings, stampings, forgings, screw machine products, patterns, special machinery, jigs, tools, dies, etc.

Rates Per Insertion on Yearly Basis 1"—$3.75 : : 2"—$7.00 : : 3"—$10.00 Rates for Other Spaces Furnished on Request

---

Let Us Do Your Grinding

Small and medium holes, or radial and external grinding.

We eat up work of this nature.

Low prices—prompt delivery.

Send blue prints or samples for quotation.

Rivett Lathe and Grinder Corporation
Brighton District of Boston, Mass.

Aluminum, Brass and Bronze
CASTINGS
EVANSVILLE ALUMINUM & BRASS CASTING COMPANY
EVANSVILLE INDIANA

CASTINGS
GRAY IRON
BRASS AND BRONZE
High Grade Work at Low Prices
Let us quote you
The Turner & Seymour Mfg. Co.
Torrington, Connecticut ***

WANTED
Medium Heavy Work

We have one of the best equipped plants in the country for handling medium heavy work. All new and up-to-date equipment served by traveling cranes. Complete pattern shop, gray iron foundry, machine shop and steel fabricating shop.

Let us figure with you on any fabricated steel, steel tanks, engines, pumps, or special machinery of any kind.

We are especially interested in a good line of equipment to manufacture.

THE SMITH GAS ENGINEERING CO.
Dayton, Ohio

Are you another HENRY FORD?

His first orders for forgings were small. We solicit the concerns that orders forgings in small quantities and prefer to continue our growth with theirs.

KILBORN AND BISHOP CO.
196 Chapel St., New Haven, Conn.

We have a Well Equipped Daylight Machine Shop

For building special machinery
Special gasoline and steam motors, etc.
Let us figure with you.
Lammert & Mann Company
Wood and Walnut Sts., Chicago, Ill.

ALL KINDS STAMPINGS
BLANKING and FORMING ASSEMBLING WORK
Lindsay Chaplet & Mfg. Co.
Harrison Bldg. Philadelphia, Pa.

PROFIT!

By selling your surplus or outgrown machinery, you can make the profit ledger happy. Let us insert your ad in the Used & Rebuilt Equipment Section.

604

PRESSED METAL PARTS

We have made millions for Textile Machinery parts at a great saving to the manufacturers. In every line, pressed metal parts are replacing castings.

PETER GRAY & SONS CO.
Cambridge, Mass.
Started 1878 and growing yet

Cleveland City Forge & Iron Co.
TURNBUCKLES & CLEVISES
DROP FORGINGS
FOR
Automobiles, Trucks and Tractors
4501 Lakeside Ave., Cleveland, O.

Mr. Manufacturer:

When you are seeking a reliable and efficient shop with which to place an order for

Castings	Patterns
Stampings	Dies, Tools & Jigs
Forgings	Special Machinery
Machine Work	Screw Machine Work

consult the firms listed in the Fill-In and Contract Work Section of IRON TRADE REVIEW

Each shop advertising is fully equipped for quality and quantity production—and their watchword is "Service".

ASK FOR THEIR BIDS

636

Work won't come to you—find it through an ad here.

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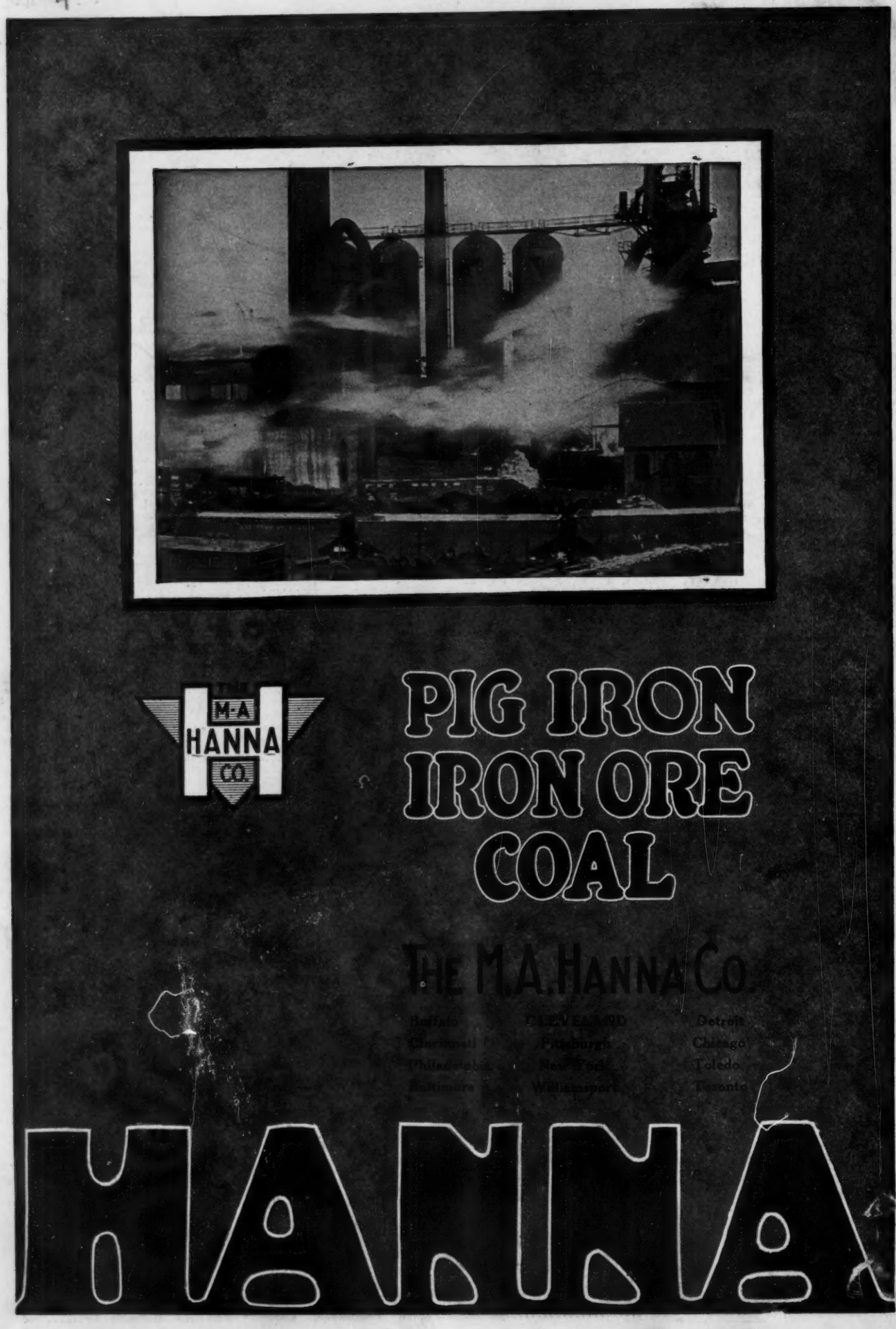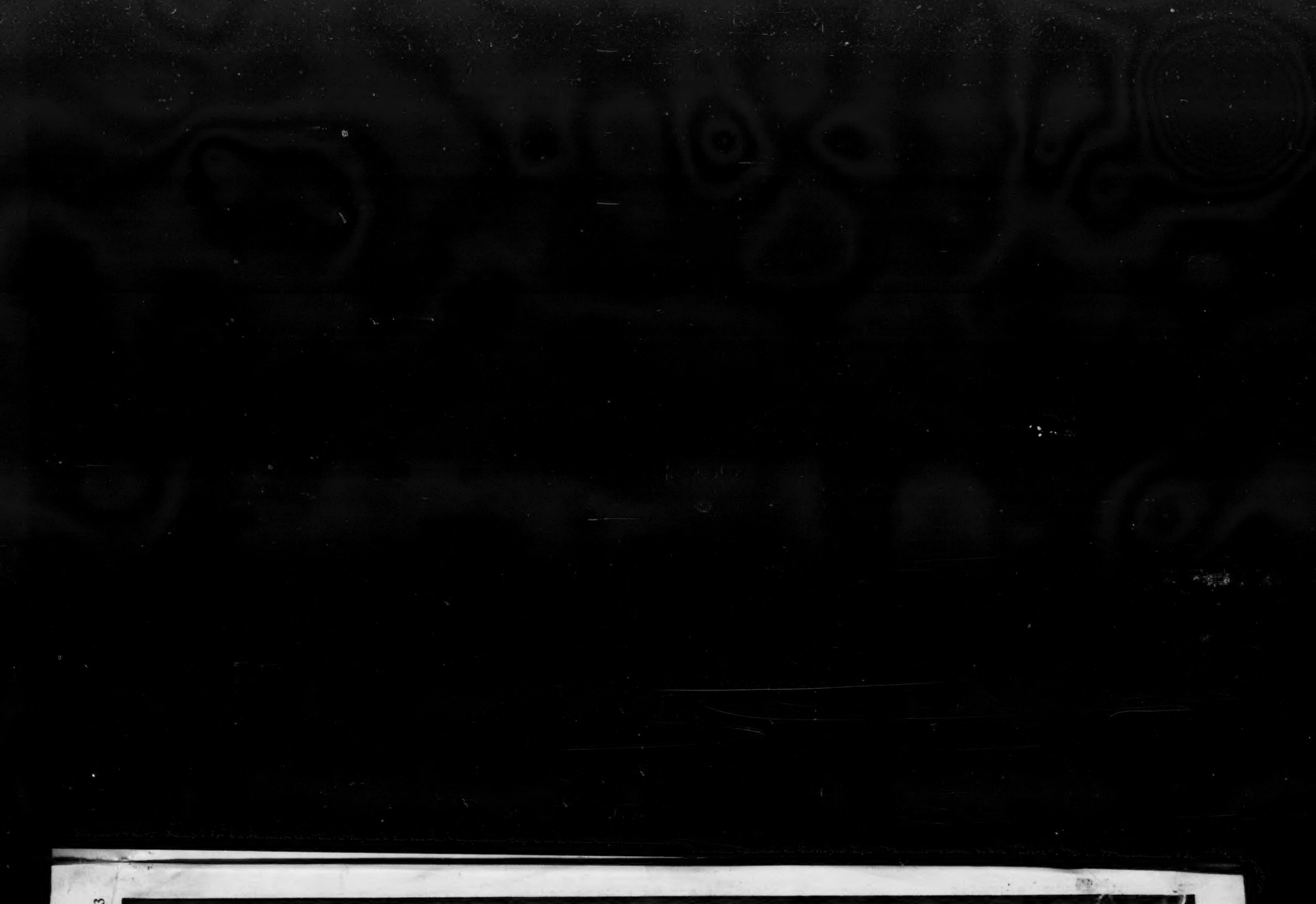
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